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WAR MACHINE

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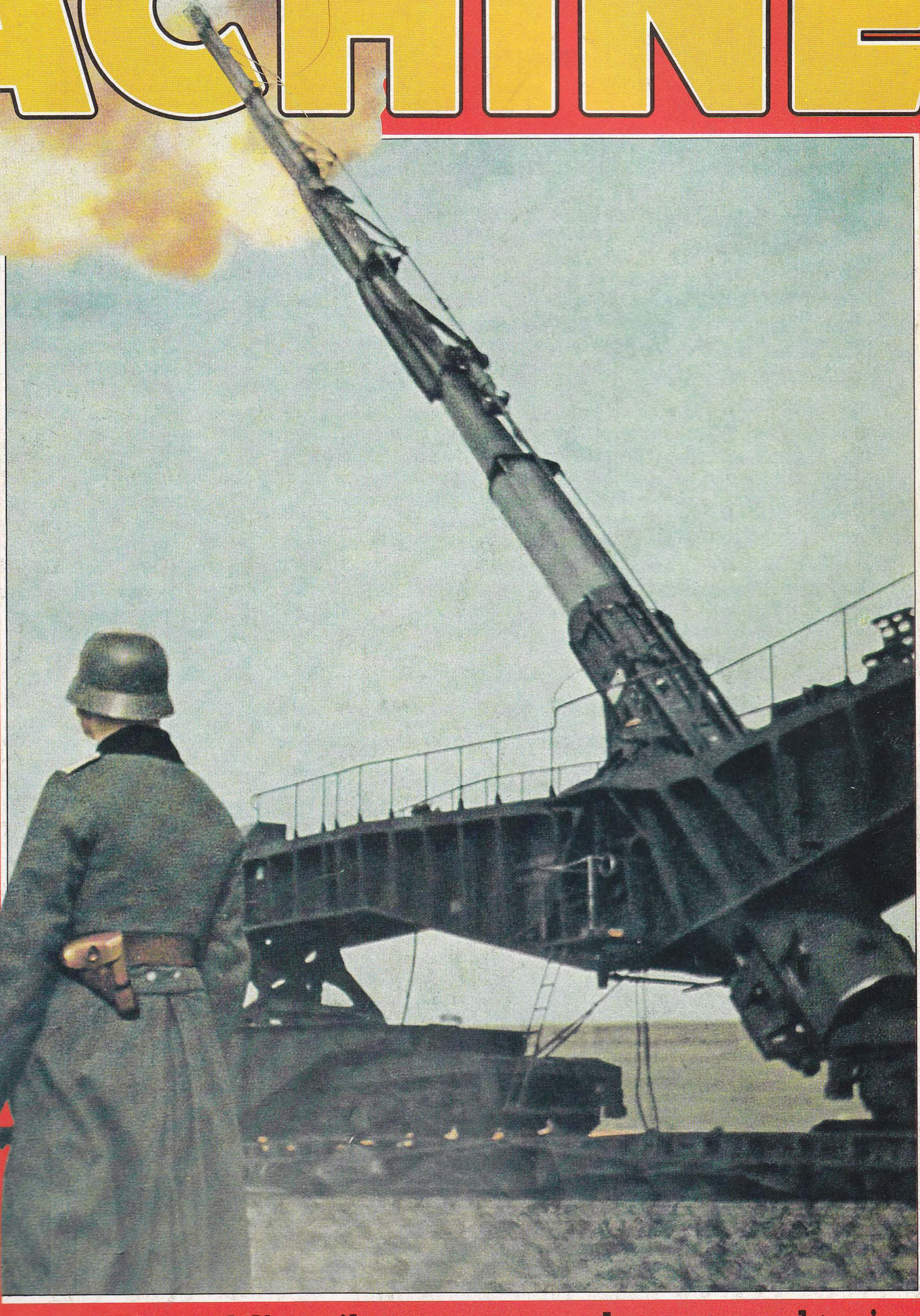

An illustrated guide to the world's railway guns and armoured trains

WAR MACHINE

Volume 1 **Issue 10**

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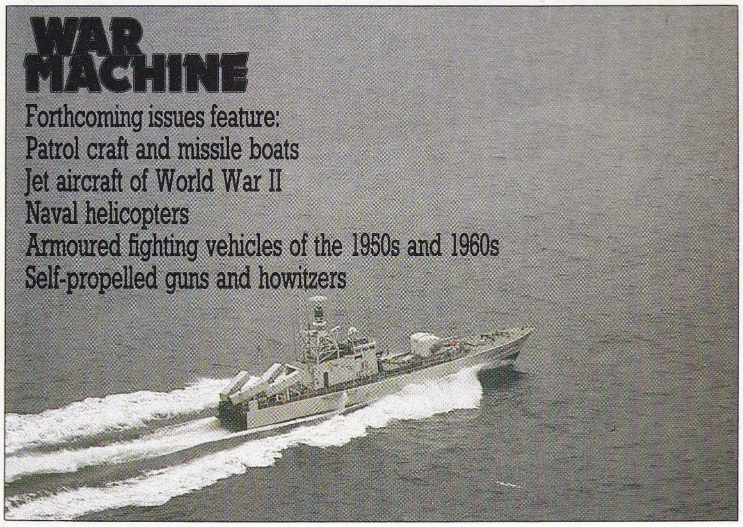
Picture acknowledgements
Cover photograph: Signal. **181:** Signal/Signal. **182:** Imperial War Museum/Imperial War Museum. **183:** Imperial War Museum/T.J. Gander. **184:** Imperial War Museum/Imperial War Museum/T.J. Gander. **185:** Imperial War Museum/Signal. **186:** Robert Hunt Library/Robert Hunt Library. **187:** T.J. Gander. **188L** T.J. Gander. **189:** Imperial War Museum. **190:** Imperial War Museum/T.J. Gander. **191:** Imperial War Museum/Imperial War Museum. **193:** T.J. Gander/Imperial War Museum/Imperial War Museum. **194:** T.J. Gander/Imperial War Museum. **195:** Imperial War Museum/Imperial War Museum/T.J. Gander. **196:** Imperial War Museum/T.J. Gander. **197:** T.J. Gander. **198:** Imperial War Museum/T.J. Gander. **(iii):** R.F./R.F. **Back cover:** Peter Foster/Royal Netherlands Navy/MARS, Lincs.



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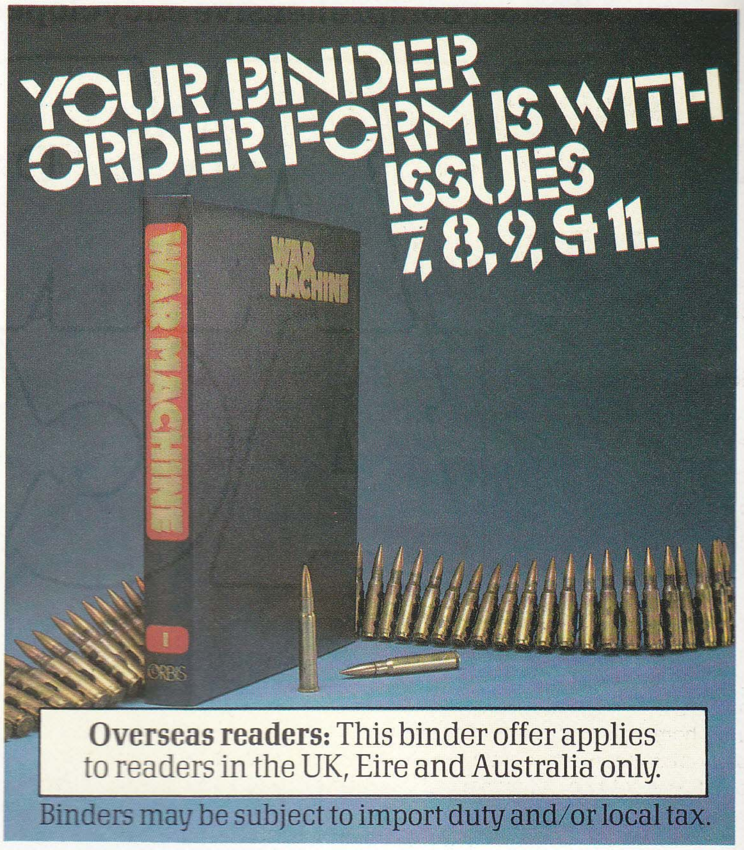

Overseas readers: This binder offer applies to readers in the UK, Eire and Australia only.
Binders may be subject to import duty and/or local tax.

Published by
Orbis Publishing Ltd
© Aerospace Publishing Ltd 1983

Editorial Offices
War Machine
Aerospace Publishing Ltd
10 Barley Mow Passage
London W4 4PH

Managing Editor: Stan Morse
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Colour Origination: Imago Publishing Ltd, Thame, Oxon
Typesetting: SX Composing Ltd
Film work: Precise Litho Ltd

Artists:
Art Workshop
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118311

Printed in Great Britain by The Artisan Press Ltd

Distribution and marketing offices:
Orbis Publishing Ltd
Orbis House
20-22 Bedfordbury
London WC2N 4BT
Telephone: 01-379 6711
Circulation Director: David Breed
Marketing Director: Michael Joyce

WAR MACHINE
Price UK 80p. IR £1. Aus $1.95. NZ $2.25. SA R1.95. Singapore $4.50. USA and Canada $1.95

How to obtain your copies of WAR MACHINE: Copies are obtainable by placing a regular order at your Newsagent, or by taking out a subscription.

Subscription Rates
For six months (26 issues) £23.80; for one year (52 issues) £47.60. Send your order and remittance to Punch Subscription Services, Watling Street, Bletchley, Milton Keynes, Bucks MK2 2BW, being sure to state the number of the first issue required.

Back Numbers
UK & Eire: Back numbers are obtainable from your Newsagent or from WAR MACHINE Back Numbers, Orbis Publishing Limited, 20-22 Bedfordbury, London WC2N 4BT at cover price.

Australia: Back numbers are obtainable from WAR MACHINE Back Numbers, Gordon & Gotch (Aus) Ltd, 114 William Street, PO Box 767G, Melbourne, Vic 3001.

South Africa, Europe, Malta and New Zealand: Back numbers are available at cover price from your Newsagent. In case of difficulty write to the address in your country given for binders. South African readers should add sales tax.

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Europe: Write with remittance of £5.00 per binder (incl p & p) payable to Orbis Publishing Ltd to WAR MACHINE Binders, Orbis House, 20-22 Bedfordbury, London WC2N 4BT.

Malta: Binders are obtainable through your local Newsagent, price £3.95. In case of difficulty write to WAR MACHINE Binders, Miller (Malta) Ltd, M.A. Vassalli Street, Valletta, Malta.

Australia: For details of how to obtain your binders see inserts in early issues or write to WAR MACHINE Binders, First Post Pty Ltd, 23 Chandos Street, St Leonards, NSW 2065. The binders supplied are those illustrated in the magazine.

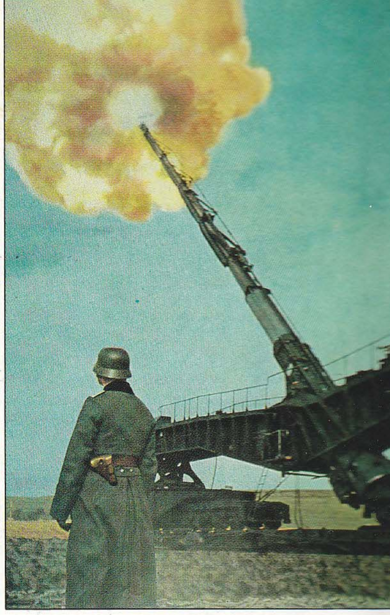
New Zealand: Binders are available through your local Newsagent or from WAR MACHINE Binders, Gordon & Gotch (NZ) Ltd, PO Box 1594, Wellington.

South Africa: Binders are available through any branch of Central News Agency. In case of difficulty write to WAR MACHINE Binders, Intermag, PO Box 57394, Springfield 2137.

Note: Binders and Back Numbers are obtainable subject to availability of stocks. Whilst every attempt is made to keep the price of the issues and binders constant, the publishers reserve the right to increase the stated prices at any time when circumstances dictate. Binders depicted in this publication are those produced for the **UK market only** and may not necessarily be identical to binders produced for sale outside the UK. Binders and issues may be subject to import duty and /or local taxes, which are not included in the above prices unless stated.

The WAR MACHINE published by Orbis Publishing Ltd has no connection with the WAR MACHINE published by Emjay. The latter is a magazine devoted to computer simulation gaming and further information and subscription details can be obtained from Emjay, 17 Langbank Avenue, Rise Park, Nottingham NG5 5BU, England.

Railway Guns & Armoured Trains



Inspired by the Paris Gun, with which the Germans bombarded the French capital in World War I, the 21-cm Kanone 12 (Eisenbahn) was designed to fire over distances of about 115 km (71.5 miles). Its only major use was to shell the coast of Kent, with little real effect.

World War II saw the last operational use of armoured trains and railway guns. Developed to meet the requirements of an earlier form of warfare, outmoded by the development of missiles and vulnerable to cannon and rocket-firing aircraft, only the German army made extensive operational use of such equipment. By 1945 railway warfare had passed into history.

Almost as soon as the railway was put into service as a means of transport the military seized upon the system as a means of converting this method of movement into a weapon of war far outstripping the possibilities of horsepower and marching men. The Franco-Prussian War of 1870 rammed home the capability of railways as a method of moving armies to a point of concentration with a speed and precision hitherto impossible, but it was not until later that railway systems were first used on a large scale to move weapons.

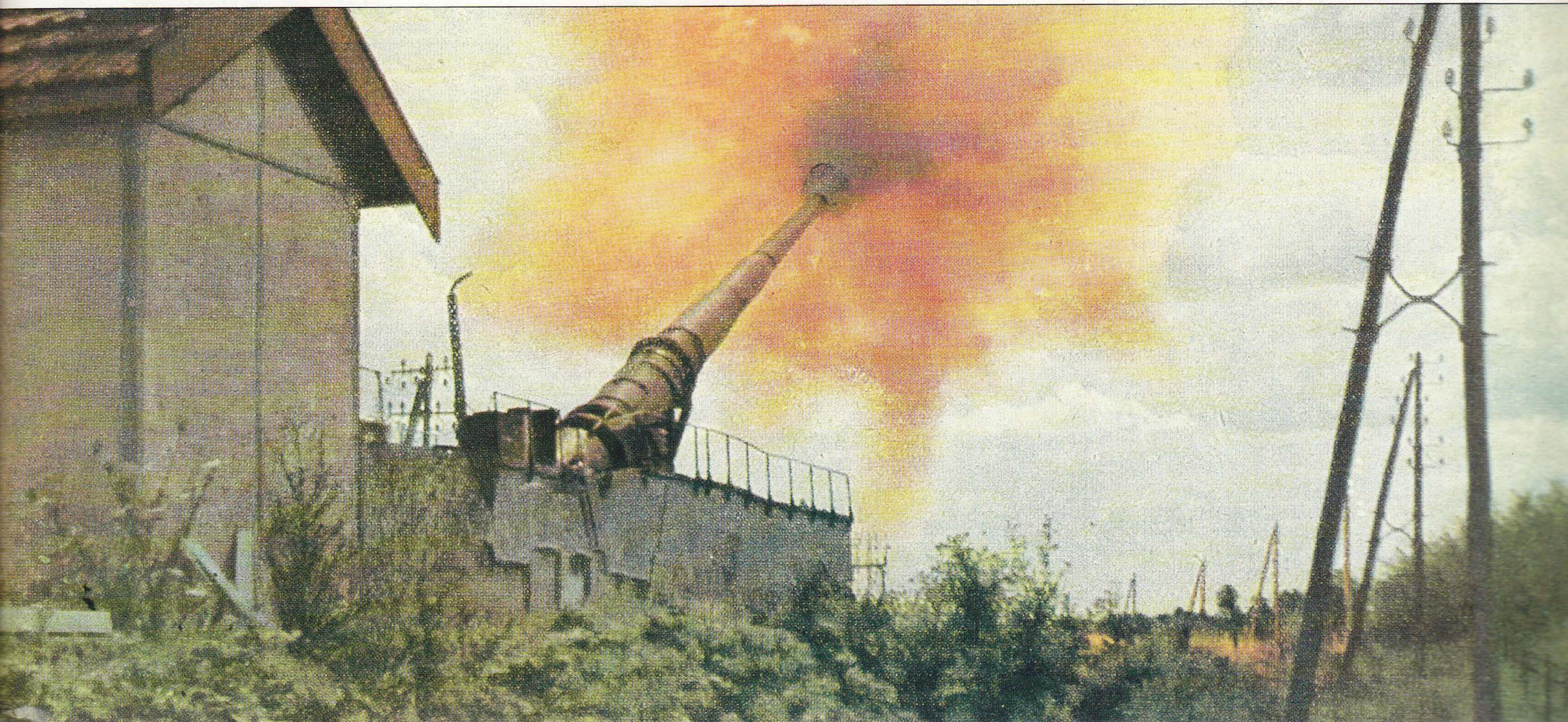
World War I saw the culmination of both the railway gun and the armoured train. The railway gun grew out of the needs of siege warfare that was represented by trench warfare in France. Very heavy artillery had to be deployed to break through the heavily-protected trench lines but the movement of such guns was a mammoth task. By placing the heavy guns involved onto railway carriages, these weapons could be moved both easily and rapidly to where they were needed, and then just as easily moved out when necessary. Armoured trains were an outcome of the more distant conflict on the Russian plains where trains could move men and weapons over vast distance, and once armoured such trains could even be used as systems of attack and mobile defence. Armoured trains were a notable feature of the Russian Civil War (1918-22).

The methods instituted during World War I were still in use during World War II. Many nations retained their World War I equipments in service up to 1939, but one nation had introduced new equipments in the form of both railway guns and armoured trains. That nation was Germany, for soon after Hitler came to power the German army instituted a crash programme of rearmament that included large numbers of railway guns and armoured trains.

The Germans used their railway guns, under control from a high military command level, for many roles. In the main such guns acted as modern siege guns, but counterbombardment and harassing fire (a typical example of which was 'Anzio Annie') were among other roles carried out. Other nations attempted to employ their ex-World War I railway equipments in similar ways, but were rarely given the chance to do so, the French army losing all its railway artillery in 1940 in the German conquest of the northern portion of the country. In the United Kingdom the elderly railway weapons were used mainly for coastal defence, although the three 343-mm (13.5-in) guns used in the Dover area had a counterbattery task to fire at their opposite numbers across the English Channel.

Armoured trains in their many forms had several roles to perform after 1939. These roles included the usual ones of acting as a type of mobile defensive reserve, patrolling rear areas and countering insurgency. But for the United Kingdom they had a new task to perform, for armoured trains were formed to provide the few weapons available after Dunkirk with some form of mobility. This rather extreme function was soon replaced by the more conventional roles as matters improved, but after 1945 the railway method of waging warfare had passed away into history. In many ways the very existence of railway warfare even in 1939 was something of an anachronism, for it had been rendered at best obsolescent by the advent of military aircraft and, later, of the long-range rocket.

The German 28-cm Kanone 5 (Eisenbahn) was the finest railway gun of the war, and the only type to see extended active service. The 25 or so produced saw service from the Atlantic Wall to Anzio.



FRANCE

Canon de 240 sur affut-truc Modèle 93/96

When the French army decided to adopt railway guns during World War I it used a large number of 240-mm (9.45-in) barrels culled from all manner of places, but when it decided to use the Modèle 93/96 coastal defence gun for the role it soon found that such a relatively modern and powerful gun had to have a more complex type of carriage than the more hasty improvisations produced to suit the less powerful weapons of the same calibre. Consequently the Modèle 93/96 guns were placed on well platforms mounted fore and aft on six-axle bogies with an arrangement that allowed the gun platform to be lowered onto the track for the firing proper. On the move the **Canon de 240 sur affut-truc Modèle 93/96** gun and carriage was dismantled into three main sections.

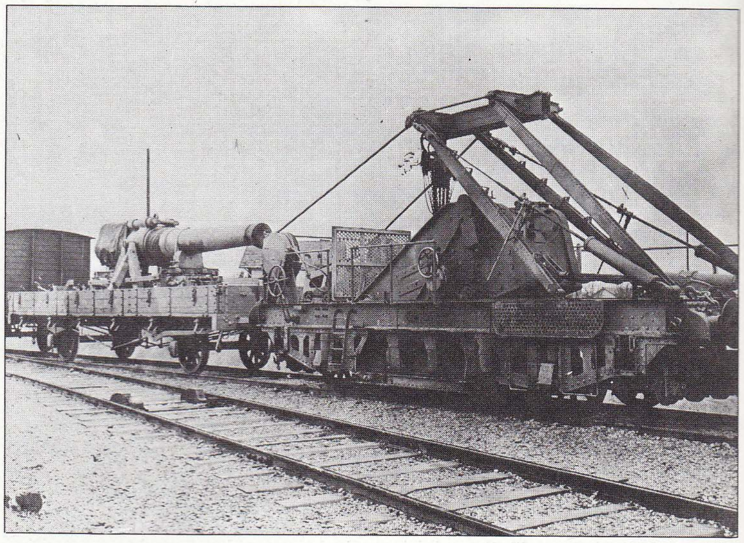
Up to 1918 the Modèle 93/96 was used for a variety of purposes, ranging from long-range counterbombardment close to the trench lines to act as a mobile reserve for coast defence. After 1918 most of the remaining equipments were diverted almost entirely to the coast-defence roles, in which they generally remained at various central depots for long periods at a time with little practice firing and often very little maintenance. In 1939 that changed and the surviving guns were quickly renovated and new crews were trained so that by the time the Germans invaded France several guns in good condition were ready for the Germans to take over after the fall of France.

With the Germans the Modèle 93/96 started a new career, this time as the **24-cm Kanone (E) 558(f)** or **24-cm Kanone (E) Modell 93/96(f)**. For a while they were retained as railway guns to equip a few training units, but by 1943 most of these had been scrapped or diverted for use as coastal defence guns. In this role the guns were completely removed from their railway mountings altogether. They were emplaced on fixed turntables that were securely based in concrete foundations, and once in place there they stayed. By late 1943 only eight of these guns were still in full-time use although some others were kept in reserve at various points. Of these eight, four were emplaced near the important U-boat port of St Nazaire, two at La Bats and the other two at Prefailles. The other four guns were sent off on a long foray to Norway, where all four were emplaced at Ofoten near the important naval base at Narvik. So far as is known none of these guns ever had to fire a shot in anger, and as soon as the war was over they were scrapped. However, it now seems that the Norwegians, not wanting to see good guns go to waste in 1945, kept the four at Ofoten in service for some years and it is far from certain that they were ever removed. It may well be that the old French guns are still there, though Norwegian security sensitivities make any confirmation of this very difficult to determine.

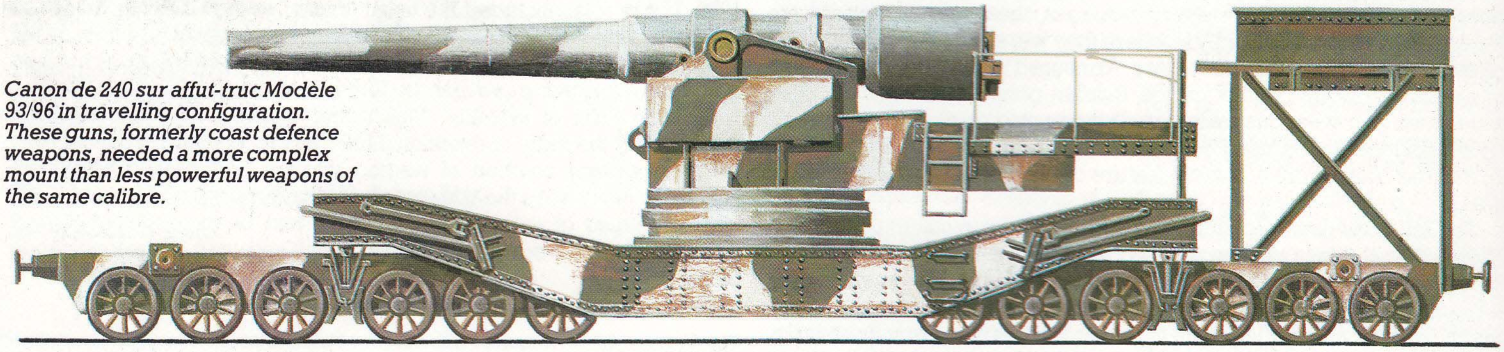
Incidentally, Schneider produced a 240-mm (9.45-in) railway gun with a L/51 barrel in 1928 and sold it to Japan. It was still around in 1941 but what subsequent use was made of it is now not known and no records survive of it being used in any action.

Specification

Precise calibre: 240 mm (9.45 in)
Length of barrel: 9.60 m (31 ft 6 in)
Weight complete: 140000 kg (308,640 lb)
Weight of shell: 162 kg (357 lb)
Range: 22700 m (24,825 yards)



A characteristic of many French railway guns dating from World War I is that the gun and carriage were separated while travelling. Here a Canon de 240 Modèle 1903 is shown.



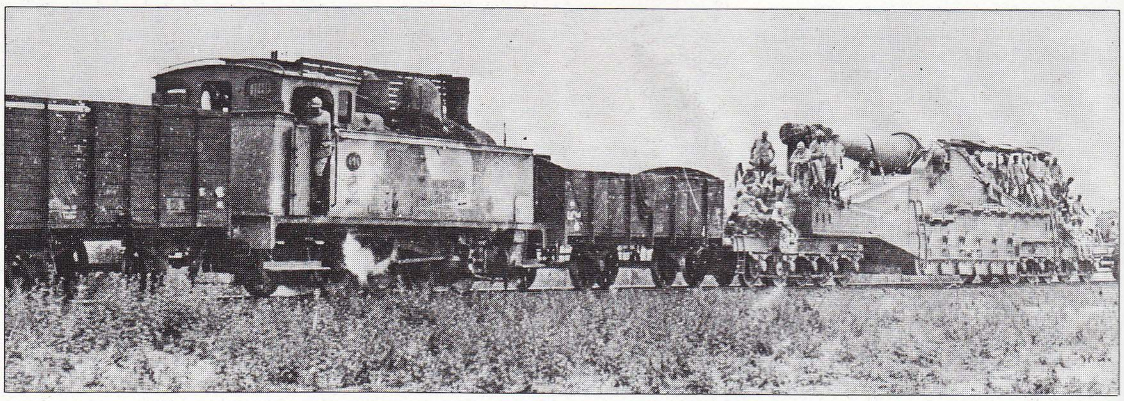
Canon de 240 sur affut-truc Modèle 93/96 in travelling configuration. These guns, formerly coast defence weapons, needed a more complex mount than less powerful weapons of the same calibre.

FRANCE

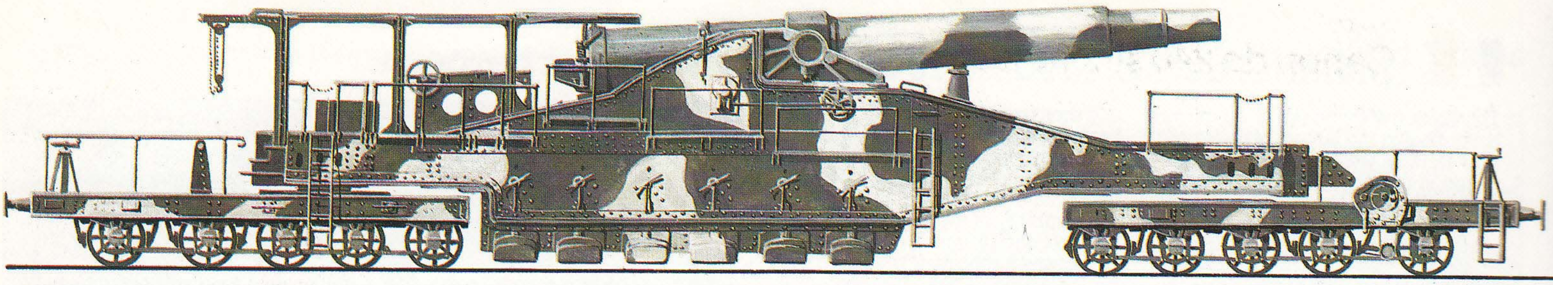
French 320-mm railway guns

When the French army started to produce large numbers of railway guns during World War I it used a large number of what had been considered obsolete naval guns or odd items from the manufacturers' stockpiles. Among these were guns with calibres of 274 mm and 285 mm (10.79 in and 11.22 in), some of which were still in use during the early days of World War II. Some of these passed into German service for a while, but generally speaking they were mainly 'one-offs' of limited military value so they were often used for training or else scrapped – their limited stocks of ammunition were used land mines and roll-bombs to bolster beach defences.

However, the next calibre up the French scale was 320 mm (12.6 in), and here there were several models of guns pressed into action, nearly all of naval origins. All of them dated originally from 1870 but to complicate matters nearly every barrel had been provided with an updating programme in different years thereafter and consequently no two barrels were exactly alike. For instance there were the **Modèle 70/80**, the **Modèle 70/84** and the **Modèle 70/93**. To make things even more complicated, the last model had an elongated chamber to accommodate a larger charge introduced to boost performance, so it was non-standard to the others. And as if that were not enough the same carriage, which had a sliding platform to absorb the considerable degree of recoil produced on firing, was also used to mount a much more modern gun, based on the Modèle 1870 series but manufactured in 1917 specially for the railway role. This was the **Canon de 320 T 17**,



320-mm 70/93 being taken into action in 1939 by French army troops, who are apparently not expecting air attack. After the fall of France these weapons were used by the Germans for coastal defence.



Canon de 320 T 17 showing overhead gantry for ammunition handling. Sharing the same carriage as much older designs dating from the previous century, Modèle 1917 was derived from naval designs.

which transformed the elderly Modèle 1870 into a good modern equipment with a useful range. Nearly all these guns, being naval in origin, used an interrupted screw thread, opened and closed by a worm-gear cranking system, and, being originally intended for use in turrets, guns were not uncommonly found with their breech blocks opening to either the right or the left.

With the fall of France in 1940 the various 320-mm (12.6-in) railway guns fell into German hands. In fact so many were captured intact and in good working order that the Germans took them into their own service. The old Modèle 1870 series of guns became the **32-cm Kanone (E) 651(f)**, with a special **32-cm Kanone (E) 651/1(f)** designation to denote the guns with the enlarged chambers and thus a special ammunition supply arrangement. The more modern 1917 guns became the **32-cm Kanone (E) 652(f).** They spent the rest of the war years being trundled around the French coastlines and were used on occasion as propaganda weapons when they were towed through some of the major French cities in shows of force. At least one was based in the south of France. The weapons appear to have made little impression during the invasions of the Normandy coast or the south of France (both in 1944) and many of them were later captured in a wrecked condition.

Specification

Modèle 1870 series
Precise calibre: 320 mm (12.6 in)
Length of barrel: 10.112 m (33 ft 2.1 in)
Weight complete: 16200 kg (357,145 lb)
Weight of shell: 387 kg (853 lb)
Range: 20500 m (22,420 yards)

Specification

Modèle 1917
Precise calibre: 320 mm (12.6 in)
Length of barrel: 11.82 m (38 ft 9.4 in)
Weight complete: 178000 kg (392,415 lb)
Weight of shell: 392 kg (864 lb)
Range: 26200 m (28,655 yards)

FRANCE

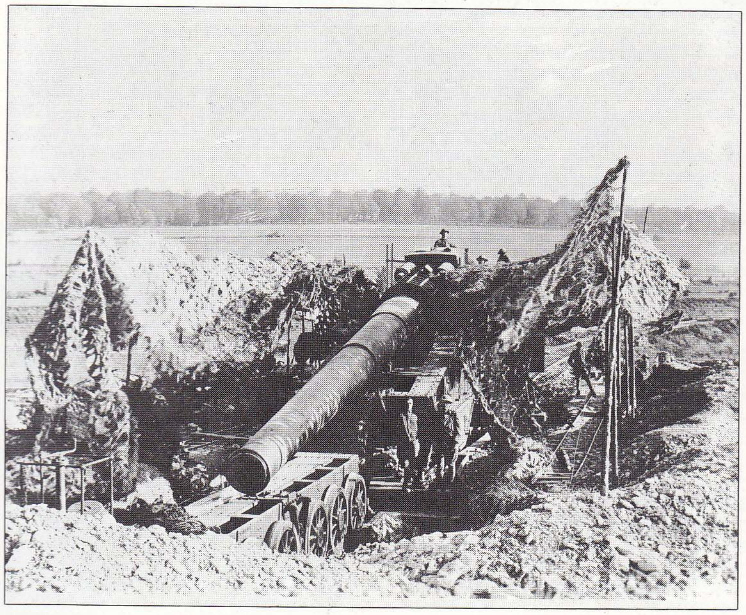
French 340-mm railway guns

As with the French 320-mm (12.6-in) railway guns, there was more than one type of 340-mm (13.4-in) gun converted to the railway gun role, usually from barrels that were either naval in origin or design. To complicate matters further, there were two types of carriage in use for a single barrel type, the **Modèle 1912**.

The first type of mounting that should be considered is the sliding mount. This was a simple concept in which the central section of the gun carriage was either lowered onto the railway tracks or chocked into place on them in such a way that the recoil forces were absorbed by the carriage sliding along the track, usually not very far in view of the large weights and masses involved. While being simple to design, produce and use, this type of carriage had the disadvantage that there was no form of traverse control, the gun being trained by accurate positioning on a curve of railway track. As the gun had to be winched or pushed back into a carefully surveyed point on the track after every shot, the rate of fire was very slow and the whole system most laborious. However, the gun and carriage combination was produced in a very short time by Schneider et Cie of Le Creusot and the type was still around in 1939.

The 340-mm (13.4-in) barrels used originally had a form of rifling that limited the potential power of the guns and the rifling was subsequently altered to capitalize on this potential. But this considerably increased the stresses produced on firing, to the extent that a new type of carriage had to be evolved. This new carriage had a cradle type of gun barrel support that enabled recoil cylinders and recuperators to be used to absorb the increased firing stresses. This new carriage was produced by the St Chamond concern, but even as it was entering service Schneider was still producing the original sliding mounts for the unaltered barrels. Thus there emerged a quartermaster's nightmare in the form of variable guns, carriages and their ammunition, all in service at the same time. At one point there were four different types of gun variation in use at one time on the sliding mounts alone.

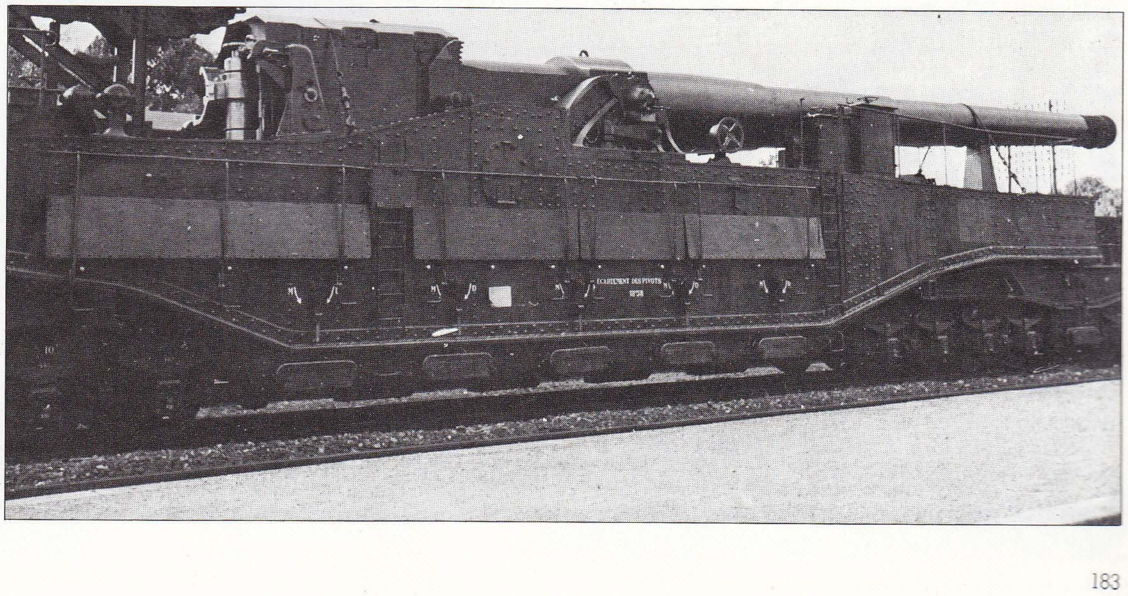
With the coming of peace in 1918 many of these supply difficulties were resolved by a rationalization of types in service. None of the 340-mm (13.4-in) guns remaining saw much use between the wars, but in 1940 many were still available to fall into German hands. Nearly all of them entered German army service either as fully operational guns based in France or kept to provide spare parts for others. Four had a special destination. These were known to the Germans as the **34-cm Kanone-W-(E) 674(f)**, with the W (*Wiege*, or cradle) denoting that the guns were of the cradle-carriage pattern. These four were removed from their railway carriages and carried on road transporters to a coastal defence site at Plouharnel, near Quiberon in Brittany. Once emplaced they stayed there until they were removed for scrap after the war, but their large gun pits can still be found there among the sand dunes.



Schneider Modèle 1912 railway gun, dismounted from its carriage onto a turntable and extensively camouflaged. In 1918, when this photo was taken, French quartermasters had the difficult task of supplying ammunition for the four variants of the barrel then in service.

Specification

Modèle 1912 (cradle mount)
Precise calibre: 340 mm (13.39 in)
Length of barrel: 15.30 m (50 ft 2.4 in)
Weight complete: 164000 kg (361,550 lb)
Weight of shell: 432 kg (952 lb)
Range: 44400 m (48,555 yards)



Schneider Modèle 1912 railway gun captured by the German army in 1940 and later used by them as part of the Atlantic Wall. Based in Brittany, near Quiberon, the dismounted barrels saw little in the way of action.

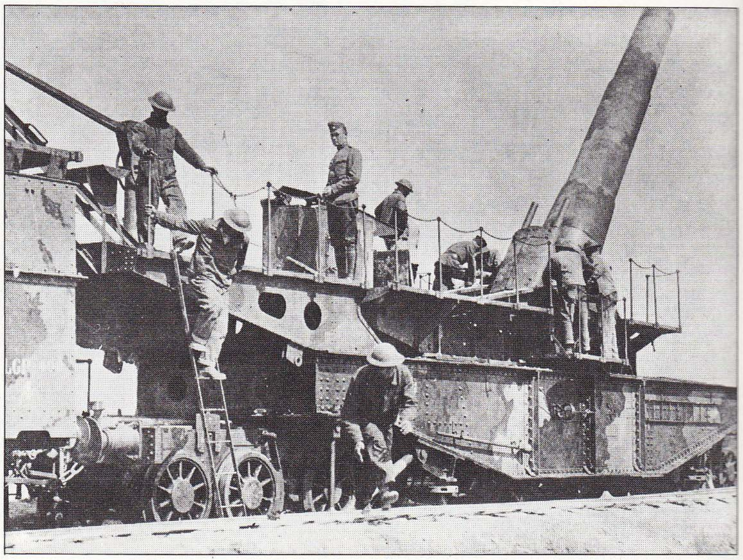
FRANCE

Matériel de 400, Modèle 15 ou 16 sur affut-truc à berceau

The French 400-mm (15.75-in) railway howitzer was the largest of their practical railway weapons, and was produced in the usual rush in 1916 to take part in the Battle of Verdun. The first two examples were ready in time to smash their way through the carapace of Fort Douamont just before the French army retook the fort from the Germans and thereafter the **Matériel de 400, Modèle 15 ou 16 sur affut-truc à berceau** was one of the most favoured of French heavy artillery pieces used during World War I.

The 400-mm (15.75-in) railway howitzer was a product of St Chamond arsenal, and the first howitzer had been produced by simply boring out a worn Modèle 1887 340-mm (13.4-in) naval gun barrel to 400 mm (15.75 in) and placing it on a special carriage. The resultant howitzer was just over 25 calibres long on a simple, clean and open carriage with an unusual method of pivoting the rear of the platform to allow a degree of traverse. Behind the breech of the howitzer was a long open platform for the loading crew, an overhang at the rear mounting a loading crane. In action this crane lifted the shells direct from an ammunition waggon onto a loading tray that delivered the shell into the interrupted-screw breech. There was one factor that slowed the speed with which the equipment could be brought into action, and that was the fact that a recoil pit had to be provided under the breech. At full recoil the barrel moved so far that without the pit the breech would have struck the track, and to complicate matters further provision had to be made for a buried recoil spade arrangement against which the full carriage could move on firing. Without this recoil spade the whole carriage moved backwards on firing and then had to be winched or pushed back to the firing point. This would have reduced the rate of fire even more from the normal one round every five minutes or so.

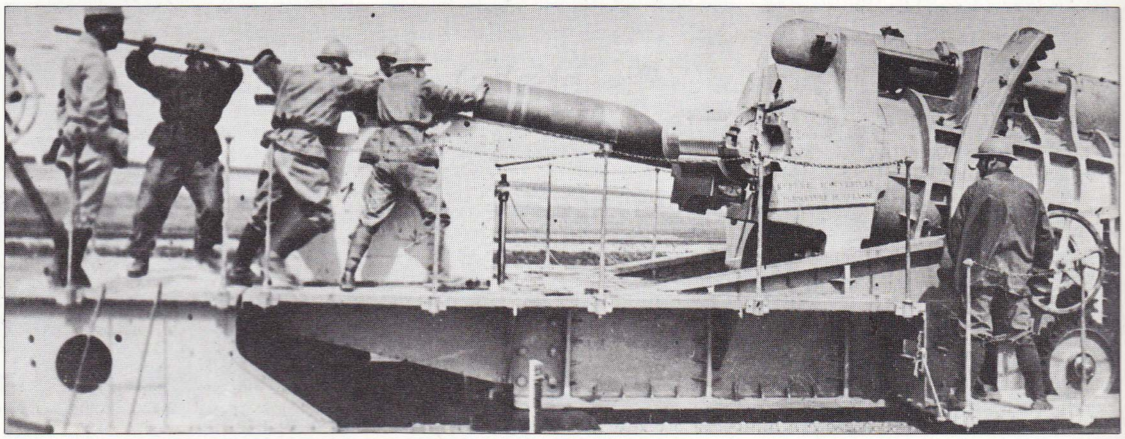
The ability of the 400-mm (15.75-in) howitzer shell to smash its way through almost any fortification was much used by the French army up to the end of 1918, but thereafter the type was retained as a preferred type which grew in importance as the 1930s advanced and it became apparent that it might have a task to fulfil against the German *Westwall*. In the event the equipments were never given a chance, for by the end of June 1940 the French 400-mm (15.75-in) railway howitzers were in German service, this time as the **40-cm Haubitze (E) 752(f)**. In all the Germans took over eight examples. Two of them were kept as reserves and to provide spare parts for the other six. These six were distributed three each to Eisenbahnbatterien 686 and 693. As far as can be determined neither of these batteries was deployed outside France, and they do not appear to have survived after mid-1944. However, at least one of these howitzers was used for a time during 1943 by German experimenters to fire special armour-piercing 'Röchling' shells against an old French fort to test their penetration qualities.



A Matériel de 400 Modèle 15 at maximum elevation in action with a crew of American soldiers in late 1918; the Americans used only one of these howitzers, which was later replaced by American equipment.

Specification

Precise calibre: 400 mm (15.75 in)
Length of barrel: 10.65 m (34 ft 11.3 in)
Weight complete: 140000 kg (308,640 lb)
Weight of heavy shell: 900 kg (1,984 lb)
Range: 15000 m (16,405 yards) with heavy shell



Hand-ramming a 400-mm (15.75-in) projectile into the breech of a 400-mm French railway howitzer, probably a Modèle 16. Thought in the 1930s to be the answer to German border fortifications, in fact they were taken over after the fall of France without seeing action.

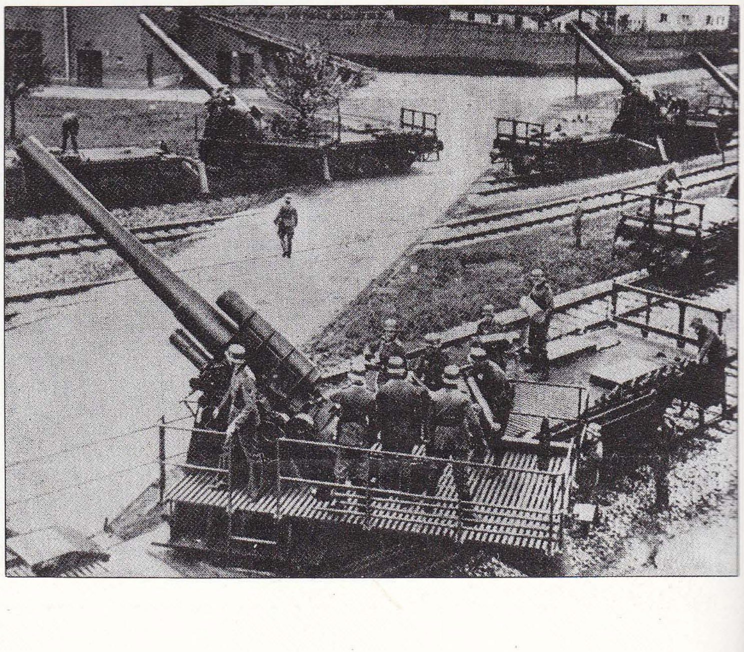
GERMANY

15-cm and 17-cm Kanonen (Eisenbahn)

The **15-cm Kanone (Eisenbahn)** and **17-cm Kanone (Eisenbahn)** railway guns were direct results of the 1936 *Sofort-Program* (emergency programme) to produce new railway gun equipments in a very short time. As with the other results of this programme, the guns were produced by placing old but stockpiled Krupp barrels onto new carriages and the 15-cm (5.9-in) and 17-cm (6.8-in) barrels were elderly L/40 ex-naval weapons. The carriage, however, was a thoroughly modern piece of engineering that enabled the relatively light barrels and their mountings to traverse through 360°. When the equipments were emplaced, much of the recoil stresses produced when the gun was fired were taken up by outriggers with jacks on each side of the railway mounting. These outriggers hinged upwards when not in use.

The carriages for these guns were the same, and were long and flat railway cars with multiple bogies at each end. The gun itself was mounted on a large platform mounted, in turn, on a heavy turntable to provide the full traverse. On most of these equipments the guns were left fully exposed, but some of the 15-cm guns carried their naval origins one stage further by having most of the firing platform and gun fully enclosed under an armoured turret of undoubted naval origin.

The first 15-cm equipments were delivered as early as 1937 and they immediately went into full-scale service even though only four were eventually produced. The main reason for this short production run was not that the gun and carriage combination was deemed imperfect, for it soon proved to be very efficient and serviceable, but that for all its efficiency and ease of production the design was too expen-

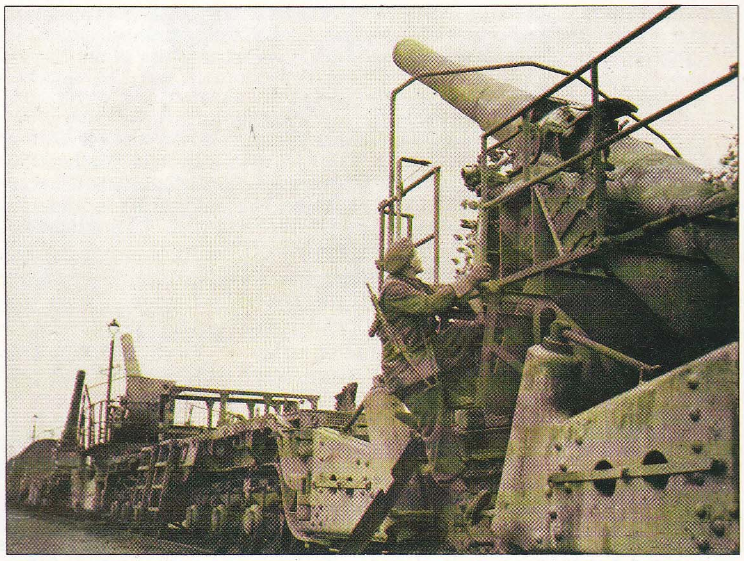


15-cm Kanone (Eisenbahn) railway guns on exercises in a railway yard in northern France in about 1941; on the gun in the foreground the crew can be seen handling separate projectiles and charges.

sive for the calibre involved. In short, the time and effort taken to place a 15-cm barrel onto a large and heavy railway carriage was not worth the ballistic results actually achieved. The 15-cm calibre was the one used by the bulk of the German army's corps artillery, while the railway guns were intended for use at higher level and thus had to be heavier to justify the bother involved. In the short term the problem was partially resolved by using 17-cm ex-naval barrels in place of the 15-cm barrels, and this went some way to resolving the problem; but even then the calibre was really too light for the expense of a railway carriage mounting. In the end only six 17-cm railway guns were produced between 1937 and 1938, and the production run then ceased. Much of the experience gained in the production and development of the carriages was later used in the design of railway carriages for heavy anti-aircraft (Flak) guns.

The 15-cm and 17-cm railway guns produced were all, at first, issued to army batteries but the 15-cm equipments later passed to the navy when they became 'Batterie Gneisenau', a title that was kept when the guns once more came under army control; the original battery title was Eisenbahnbatterie 655. The 17-cm guns were used by two batteries, Eisenbahnbatterien 717 and 718. In service these guns had very varied careers. When they were first introduced they spent a great deal of their time being pulled around the Reich on propaganda tours, the guns being openly deployed in marshalling yards and sidings on public show; by this measure the 10 guns appeared to be available in greater numbers than they were. But with the coming of war the guns settled down to a more mundane routine. They had little to do before 1940, when they were used to bolster coastal defences along the captured French coast, and later some of the equipments were incorporated into the formal coastal defences north of the Pas de Calais and along the Belgian and Dutch coasts. The batteries were frequently moved. In 1945 some of the guns were still in service, but their light calibre and vulnerability to air attack and counterbattery fire rendered them of little practical use.

Specification
15-cm K (E)
Nominal calibre: 15 cm (5.9 in)
Precise calibre: 149.1 mm (5.87 in)
Length of barrel: 5.571 m (18 ft 3.33 in)
Weight complete: 74000 kg (163,140 lb)
Weight of shell: 43 or 52.5 kg (95 or 116 lb)
Range: 22500 m (24,605 yards)



Specification
17-cm K (E)
Nominal calibre: 17 cm (6.7 in)
Precise calibre: 172.6 mm (6.8 in)
Length of barrel: 6.90 m (22 ft 7.66 in)
Weight complete: 80000 kg (176,365 lb)
Weight of shell: 62.8 kg (138 lb)
Range: 26100 m (28,545 yards)

A battery of 17-cm Kanonen (Eisenbahn) captured in Holland in 1945, clearly showing one of the outrigger legs in the foreground. A product of the emergency construction programme of 1936, the guns were really stockpiled Krupp naval barrels mounted on modern, efficient carriages.

GERMANY

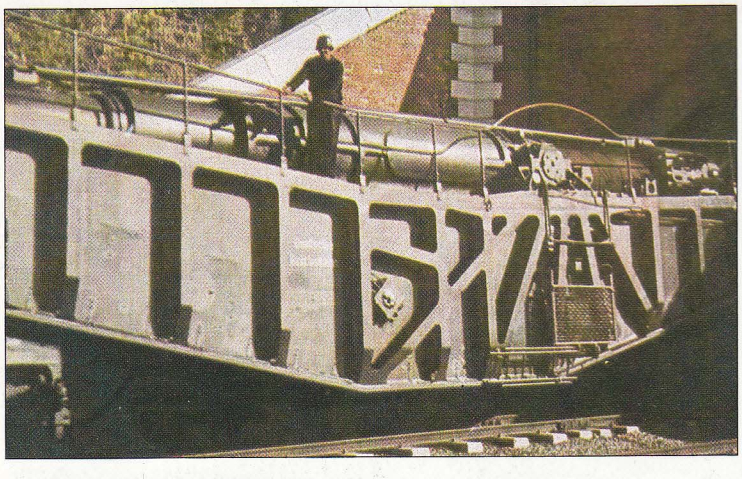
21-cm Kanone 12 (Eisenbahn)

In many ways the **21-cm Kanone 12 (Eisenbahn)** was not so much an operational gun but a full-scale exercise in internal and external ballistics of the type that is a designer's delight but a practical soldier's headache. The weapon had its origins in the infamous 'Paris Gun' of 1918, used to bombard Paris at ranges of up to 116 km (72 miles), but at a very slow rate of fire. What really caused the introduction of the 21-cm K 12 (E), however, was the fact that the Paris Gun had been a German Navy project, a fact that severely irritated the German artillery arm, to the extent that it felt that it should have a comparable weapon to match the performance of the Paris Gun or even better it. The end of the war in November 1918 ended that idea temporarily, but the inter-war years were spent in working out all the many and varied mathematical problems involved in long-range gun design to the extent that by 1935 some laboratory tests could be made.

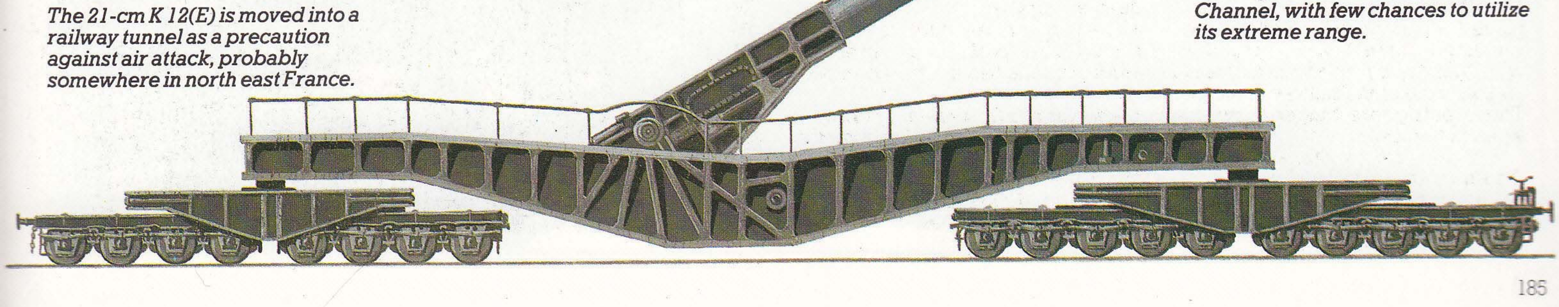
The first tests were carried out with a 105-mm (4.13-in) test barrel, demonstrating that one way to avoid the excessive wear attendant on using large propellant charges and long barrels to produce long ranges was to fit the projectile with machined splines that fitted into the rifling of the barrel. Following on from these tests a 21-cm (8.3-in) barrel was produced in 1937 but this barrel introduced its own problems. One was that it was so long that special bracing struts had to be built around much of the length of the barrel to prevent the latter from bending under its own weight. The full length was L/158 (the barrel was 158 times as long as its calibre, resulting in a length of 33.34 m/109 ft 4.6 in). The carriage designed to mount so long a barrel had its own problems, one of which was that to balance the barrel the pivots had to be so placed that when the gun recoiled it would strike the ground unless a pit had been provided.

The K 12 (E) provided the designers with a great deal of practical experience in long-range gunnery and ballistics, but the German army was not so certain of the value of the weapon. But in 1938 it entered service and was kept under wraps as a form of 'secret weapon'. Tests showed that its maximum range was of the order of 120 km (75 miles), but that the wear problem the splined ammunition was supposed to alleviate only attenuated the problem to the extent that barrel life was about 90 rounds.

In 1940 the K 12 (E) went into action



The 21-cm K 12(E) is moved into a railway tunnel as a precaution against air attack, probably somewhere in north east France.



The long, slender lines of the 21-cm Kanone 12 (Eisenbahn) show it to have been a thoroughly modern design but a poor practical weapon, despite its potential range of 115 km (71.4 miles). Its career consisted of lobbing a few shells across the Channel, with few chances to utilize its extreme range.

from the Pas de Calais area, when it fired a few projectiles at Kent across the English Channel. The farthest any of these projectiles recorded was fired at Rainham, a distance of about 88 km (55 miles) from the gun, but others probably went unnoticed for the 21-cm (8.27-in) shell carried only a small payload of explosive. In fact the payload was too small for all the cost and effort involved, and the gun was an operational failure.

This did not deter the designers, who had already produced a new design to overcome many of the original carriage shortcomings. The new carriage had an elevating device that raised the barrel level on firing so that the breech would not strike the ground, and this new carriage replaced the old gun in service. Only one of these guns was thus in use at any one time, in the charge of Eisenbahnbatterie 701. This unit trundled its huge charge up and down the coast of occupied Europe between the Pas de Calais and the Netherlands. Now and again it fired the occasional round, mainly for experimental purposes, but there were few opportunities to make any use of the its extreme range and the second gun was captured in the Netherlands during the Allied advances of 1945. The cost and manpower investment in the 21 cm K 12 (E) were enormous, and the Germans had little to show for it all at the end other than a mass of ballistic data soon to be rendered academic by the advent of the guided missile and high-speed aircraft.

Specification

Precise calibre: 21.1 cm (8.3 in)
Length of barrel: 33.34 m (109 ft 4.6 in)
Weight complete: 309000 kg (681,215 lb)
Weight of shell: 107.5 kg (237 lb)
Range: about 115 km (71.5 miles)

GERMANY

28-cm Kanone 5 (Eisenbahn)

Whereas the *Sofort-Program* railway guns were extemporized designs using existing barrels and carriage drawings, the **28-cm Kanone 5 (Eisenbahn)** was designed from scratch from 1934. Drawing extensively from the earlier decade of theoretical research the Krupp designers were able to draw up plans for a well-balanced design with a good operational range and firing a good-sized projectile with a useful payload. After a period of test firing with 15-cm (5.9-in) sub-calibre models, production went ahead of a series of railway guns that became known as the 28-cm K 5 (E), a design that was to emerge as one of the finest railway guns ever made, the *schlanke Bertha* (slim Bertha).

The first K 5 (E) guns entered service in 1936, and thereafter the type remained in production until 1945. The final number produced is now uncertain, but it is believed that between 25 and 28 were made. In almost every way the K 5 (E) was a sound, thorough design with a 'clean' carriage, extensive ammunition handling equipment, and a long slender barrel that provided the gun with its nickname. By February 1940 eight were already in service, some having been produced at the Hanomag plant in Hanover as the result of experience gained in the earlier production of the 28-cm kurze and lange Bruno equipments. But soon thereafter came a series of unexplained barrel failures that defied reason or understanding. A series of trials and experiments then began, and during the course of these a barrel with shallower grooves was produced. This barrel proved to be entirely satisfactory in every way, so it was adopted for subsequent production and the troubles disappeared. Production went ahead at full speed for the K 5 (E) proved to be so good that demands came from all fronts for more.

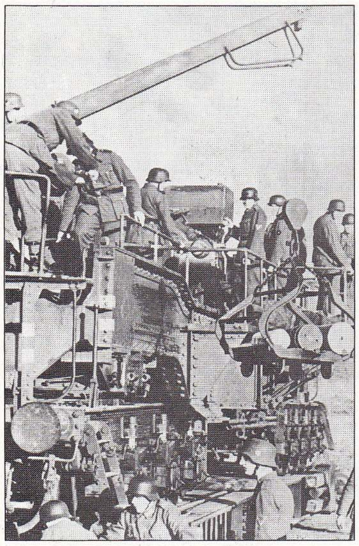
Along with the demands came the tinkering with details that German artillery design staffs seemed to be so liable. No design was ever considered perfect and a variety of minor changes were introduced to try out new ideas and to improve performance. One of these ideas involved a muzzle brake for some reason, and in another experiment the traditional German horizontal-action breech mechanism was replaced by a screw-type breech block. The ammunition was prone to all manner of experimentation but one trial that later led to service adoption was the introduction of a rocket-boosted projectile that allowed the rocket motor to fire just when the normal momentum was dropping away. This enabled very long ranges to be achieved, but only at the cost of very poor accuracy as a result of the inherent unreliability of the rocket motor 'burn'; moreover, only small explosive payload could be carried. Once again a piece of German technical ingenuity was unmatched by operational success.

One complete K 5 (E) was produced with a smooth barrel to become the **K 5 Glatt** (smooth). This conversion was intended to fire the long-range Peenemünder Pfiel Geschoss (Peenemünde arrow shell) and a series of seven of the variant was ordered. Apparently only two were made by the time the war ended but both were used operationally to fire at Maastricht from a base near Bonn during 1945. Another idea mooted for the K 5 (E) was the ability for the gun and the main carriage section to be carried between two turretless Tiger tanks across country. This project was intended to provide the gun with mobility when railways were useless or non-existent, but the idea got no further than the model stage even though full development was planned.

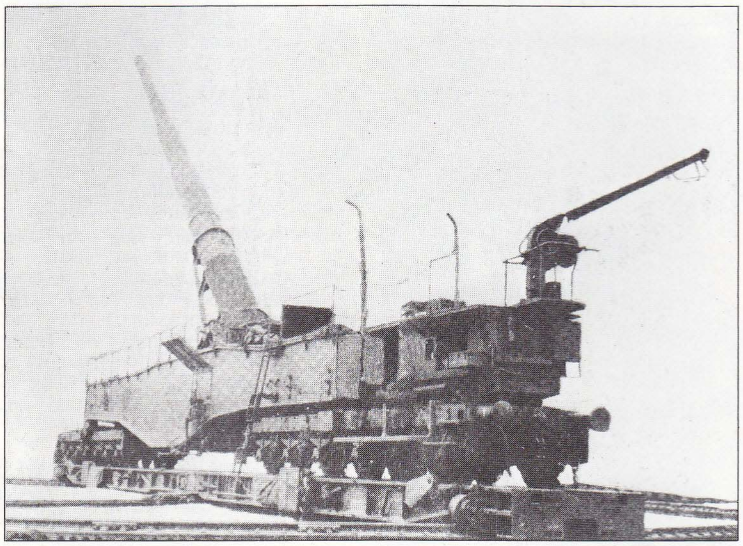
In service the 28-cm K 5 (E) proved to be a formidable weapon and it was widely used on all fronts. On the Atlantic Wall the type was used by the German navy for coastal defence duties, including some cross-Channel shelling against Dover, and in some locations special protected hangars were constructed to protect the guns and their carriages. Two guns from a special railway artillery regiment were in action during the siege of Leningrad, and more were used during the early stages of the massive battles around Stalingrad. There were plans to take at least one to Tunisia during the last stages of the campaign there but that came to nothing and the guns intended for North Africa remained in Italy instead, subsequently taking part in the Anzio battles. Wherever the German army fought there was usually a K 5 (E) involved somewhere, and the special railway trains pulling one or two guns along with all their special ammunition waggons and accommodation carriages were seen all over occupied Europe.

Specification

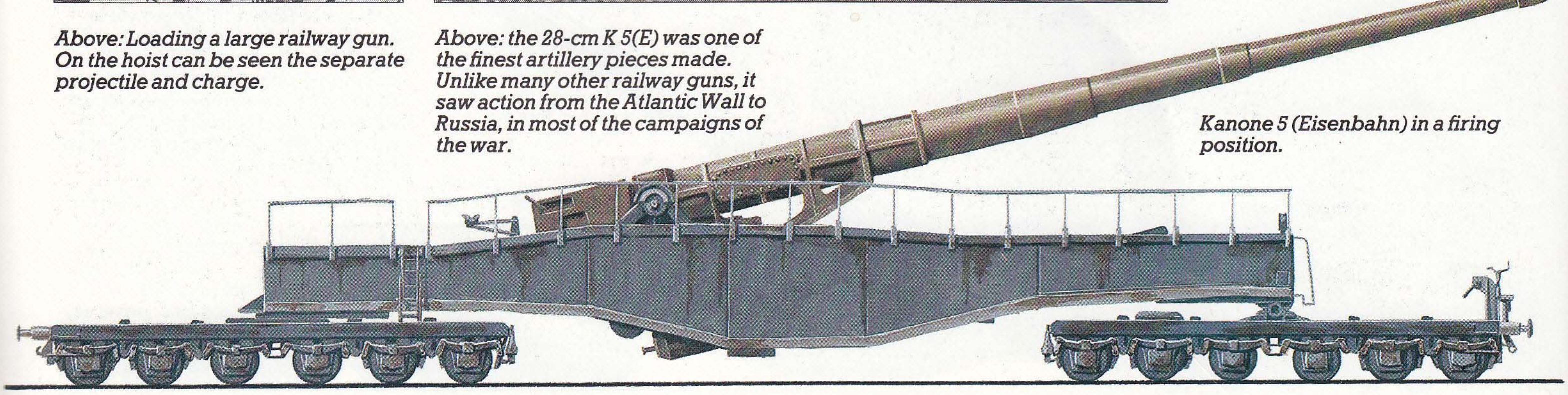
28-cm Kanone 5 (E)
Precise calibre: 28.3 cm (11.14 in)
Length of barrel: 21.538 m (70 ft 8 in)
Weight complete: 218000 kg (480,600 lb)
Weight of shell: 255 kg (562 lb)
Range: 62400 m (68,240 yards)



Above: Loading a large railway gun. On the hoist can be seen the separate projectile and charge.



Above: the 28-cm K 5(E) was one of the finest artillery pieces made. Unlike many other railway guns, it saw action from the Atlantic Wall to Russia, in most of the campaigns of the war.



Kanone 5 (Eisenbahn) in a firing position.

'Anzio Annie' in Action

As the Allied troops of the VI Corps stormed up the beaches at Anzio and Nettuno, south of Rome, in January 1944 their commanders supposed that between them and the city of Rome there were few German troops to oppose them. The bulk of the German forces were farther to the south manning the strong Gustav Line of defensive positions that included the mountain fortress of Cassino. It was the very strength of the Gustav Line that had led to the Anzio amphibious operation that was intended to turn the line by landing in its rear to open the road to Rome, but the whole landing operations were conducted on so tight a manpower and logistic shoestring that Major General John Lucas commanding the subsequent beach-head, deemed it prudent to build up his supplies and strength (especially in armour and heavy artillery) before he ventured forwards into the Alban Hills, despite the fact that ground and air reconnaissance found virtually no opposition.

By the time Lucas deemed it possible to advance, his adversary Generalfeldmarschall Albert Kesselring had raked together existing forces and formed new units to make the 14th Army to obliterate the beach-head. When the Allies advanced they were countered by strong German forces that included some Panzer units and fresh troops from the north of Italy. They also encountered the German railway guns.

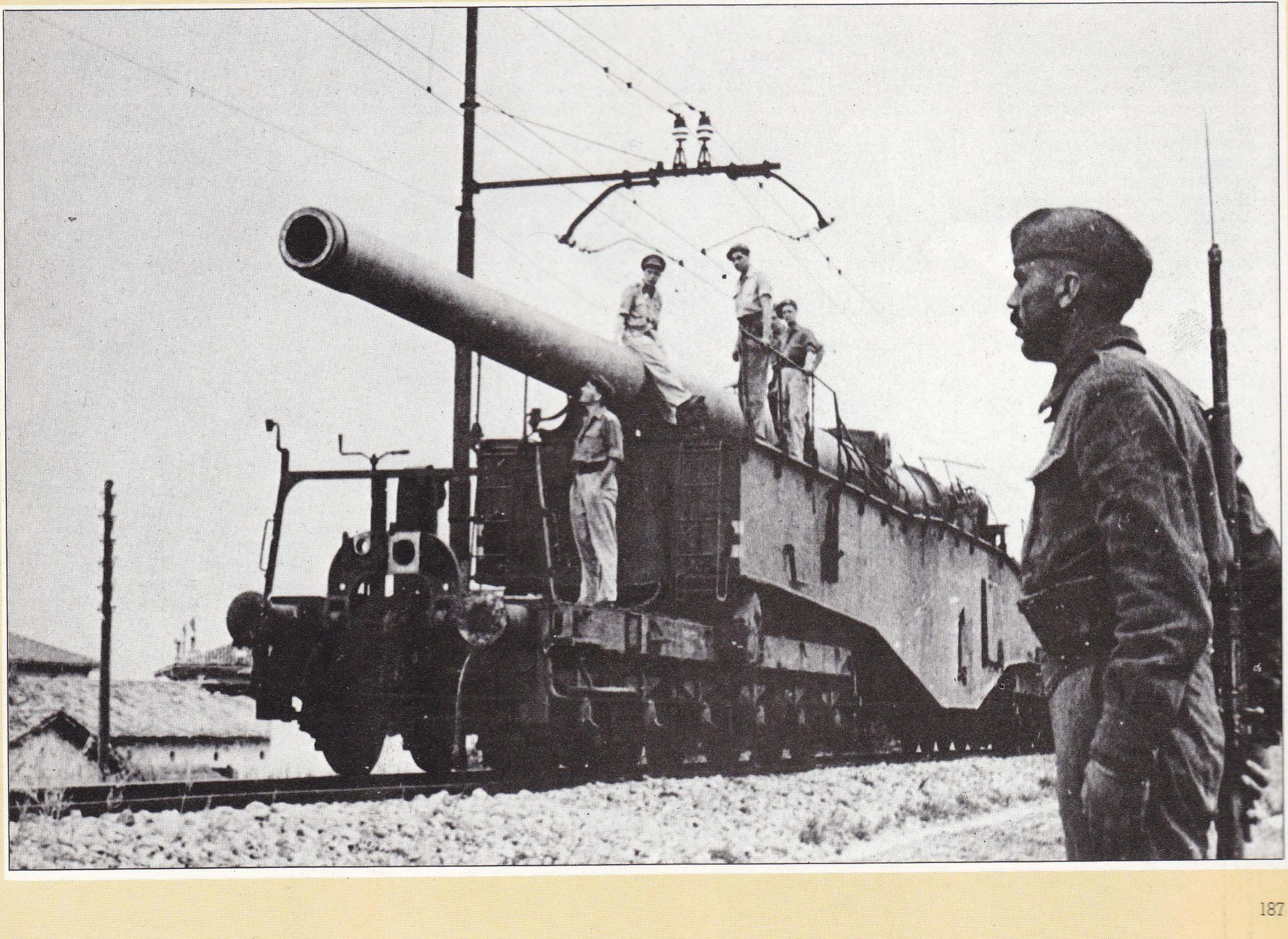
The railway guns involved were two 28-cm K 5 (E)s that had originally been sent to Italy for shipment to Tunisia, that campaign ending before they could be shipped. The guns had since spent their time in the Milan area and were sent south to the Anzio area via Rome at the end of January 1944. Once in position only one gun could be kept in action at any one time for, although a near-perfect firing point for a railway gun was found, it could accommodate only one gun at a time. This position was not far from Albano on the main Rome to Nettuno railway line at a point where the track entered a tunnel. The K 5 (E) could be kept under cover in the tunnel, being pushed out to fire and immediately pulled back in again once the round had been released. Although the track in and out of the tunnel was a double one at the site it was deemed safer to operate only one gun at a time with the other gun kept in another tunnel farther to the north.

Constant shelling

For four months the two guns between them made the lives of the Allied soldiers in the Anzio beach-head as difficult as possible. A constant drizzle of 28-cm (11-in) shells was scattered all over the confines of the beach areas and the country inland in conjunction with a constant bombardment from lighter artillery units and the continuous threat of Luftwaffe attacks. The Allied air force did what they could to find and destroy the K 5 (E) firing site but the area was well camouflaged and the gun was always kept inside the tunnel when Allied aircraft approached. In time the fire from the K 5 (E) became so regular that the Allied troops named the guns 'Anzio Annie' and the name has stuck to this day, despite the fact that two guns were involved. They wrought considerable damage between them, and remained in action until the Allies broke through the Gustav Line to the south.

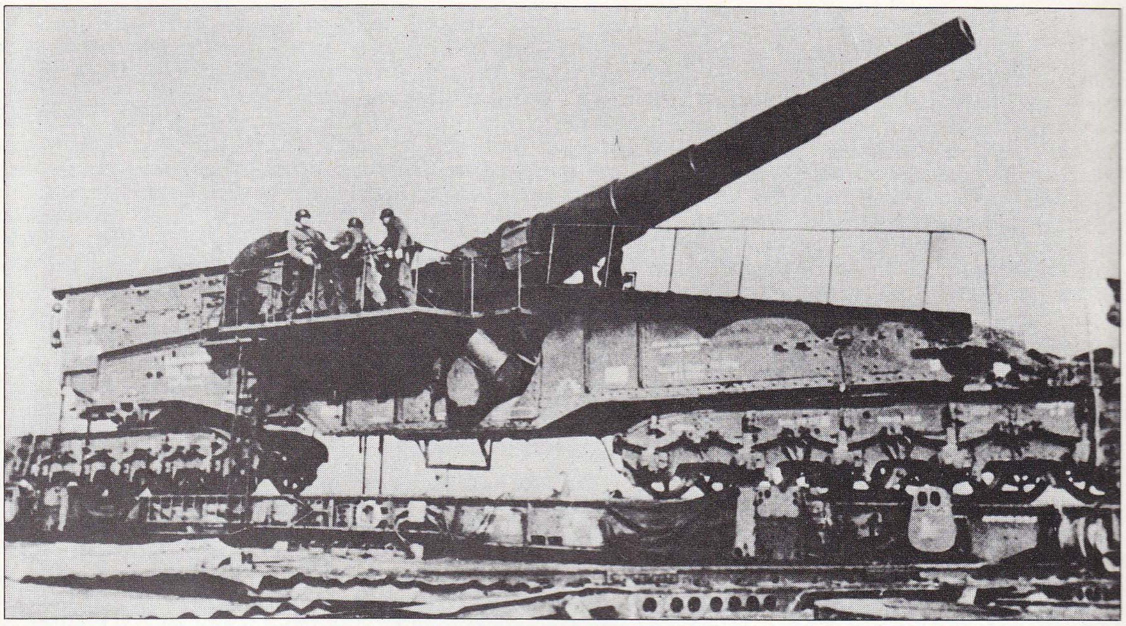
With the fall of Cassino to Polish forces, the Gustav Line was broken and the Allies stormed north to relieve the Anzio beach-head. This they did by moving rapidly north not along the coastal route but inland to the extent that they cut off the railway lines that provided the two K 5 (E)s with their escape route. The guns were thus captured almost intact and ready to move out. One gun was damaged by its crew before capture but the other was found almost complete and this example was subsequently shipped to the United States for examination and test firing. The major components of the other gun were also shipped to the USA, and when the examination programme was completed bits of both guns were put together to form the exhibit that is now on public show at the Aberdeen Proving Grounds in Maryland. Now named 'Leopold' for some reason, this K 5 (E) is the only example of its kind that can be seen in the West, not only of a K 5 (E) but also of a large railway gun; a weapon that has now been assigned to history, for no form of railway artillery is in use anywhere today.

'Anzio Annie', a 28-cm K 5(E), after capture in 1944; this is the gun that is now to be seen at the Aberdeen Proving Grounds, Maryland, USA. With her partner, this gun wrought considerable damage upon the Anzio beach-head.



GERMANY

28-cm kurze Bruno Kanone (Eisenbahn) and lange Bruno Kanone (Eisenbahn)



A 28-cm kurze (short) Bruno Kanone (Eisenbahn) on a training shoot, showing its distinctive 'high' mounting due to the normal practice of lowering the central gun carriage onto a turntable for firing. Note the shelter to provide some protection for the crew and ammunition on exposed sites.

The 28-cm Bruno railway guns were another product of the 1936 *Sofort-Programm*, again using rather ancient naval gun barrels from the Krupp stockpiles. Once again Krupp of Essen was in overall charge of the Bruno programme, but by the time the company was ready to proceed with the 28-cm portion of the programme even its massive production resources were stretched to the limit and Krupp had to farm out the assembly and much of the carriage production to the Hanomag concern at Hanover. This decision had good long-term results when it came to full-scale production of the 28-cm K 5 (E).

Hanomag based its production on a slightly modernized form of the 'Bruno' railway gun carriage dating from World War I. This carriage had proved itself very adaptable and serviceable during that conflict, and as Krupp still had the production drawings to hand it did not take long to get production under way once more. The design was fairly conventional in railway gun terms and contained little of note. The carriage did carry over one undesirable feature from World War I in that like so many designs of its period it provided the gun with virtually no traverse on the carriage itself. Traversing had to be carried out by either using railway track arcs or by carrying a turntable with the gun. This latter course was the expedient used with the Bruno carriages.

The **28-cm kurze Bruno Kanone (Eisenbahn)** used pre-1914 L/40 naval barrels. Eight examples were produced and issued for service during 1937 and 1938, and once in service the carriages underwent a long-term modification programme that gradually eliminated some of the original World War I carriage features such as the centrally-mounted turntable jack under the main carriage box section. Originally this had been used to provide a greater degree of traverse, but the introduction of the lighter and handier portable turntable eliminated the need for such a weighty device. In its place some of the kurze Bruno carriages sprouted steel shelters behind the breech to provide some measure of weather protection for the gun crews on exposed sites. The eight guns produced were used in action by Eisenbahnbatterien 690, 694, 695 and 696, each battery having two guns.

The **28-cm lange Bruno Kanone (Eisenbahn)** had a barrel length of L/45. Again these were ex-naval guns and their carriages followed much the same general lines as those used on the kurze Bruno carriages, and incorporated the same long-term modifications. Only three lange Bruno gun and carriage combinations were produced, being issued during 1937 and 1938. Having slightly different ballistic features from the shorter 28-cm Bruno barrels, all three of the lange Brunos were used by only one battery, Eisenbahnbatterrie 688, with only two guns in use at any one time.

The operational use of the 28-cm Bruno guns varied considerably. For long periods some of the batteries were emplaced for coastal defence along the Atlantic Wall. In this role the portable turntables were usually replaced by more permanent structures with extra recoil-absorbing cylinders incorporated into their load-bearing framework. Some of these special emplacements were constructed along the Belgian coast. During 1941 and 1942 some of the Brunos were used on the Eastern Front once special track-laying had been completed, but generally they were more in use in the West. Reports can be found of numbers being captured there during both 1944 and 1945.

Specification
28-cm kurze Bruno K (E)
Precise calibre: 28.3 cm (11.14 in)
Length of barrel: 11.20 m (36 ft 8.9 in)
Weight complete: 130000 kg (286,595 lb)
Weight of shell: 240 kg (529 lb)
Range: 29500 m (32,260 yards)

Specification
28-cm lange Bruno K (E)
Precise calibre: 2.83 cm (11.14 in)
Length of barrel: 12.735 m (41 ft 9.4 in)
Weight complete: 123000 kg (271,165 lb)
Weight of shell: 302 kg (666 lb)
Range: 28500 m (31,170 yards)

GERMANY

80-cm Kanone (Eisenbahn)

The **80-cm Kanone (Eisenbahn)** was quite simply the biggest gun ever built. Nothing like it had even been conceived before it was first proposed as a possible method of smashing a way through the French Maginot Line defences in a series of studies made in 1935, but Krupp thought the whole idea a waste of time and shelved the design studies. However, Hitler himself saw these design studies during 1936, and the whole scale of a massive gun with a calibre of no less than 80 cm (31.5 in) seized his mind and fed his Wagnerian obsession with scale. Consequently Krupp went ahead with detail design and the German army was virtually forced to order three equipments, the first to be delivered during 1940.

Making the 80-cm K (E) was no easy task, and even the huge Krupp factories were hard put to find the space and machines actually to machine the huge sub-assemblies. The year 1940 came and went with the first gun still incomplete but the first barrel was proofed by the end of 1940 and the following year the first full equipment underwent its trials at the Rugenwalde ranges. But by then there was no task for it to fulfil until the following year, when it was dragged in 25 separate loads to the outskirts of Sevastopol to take part in the massive bombardment of that unhappy Soviet port.

From the design point of view the actual design of the 80-cm (31.5-in) gun was entirely conventional, to the extent that it retained the traditional German sliding breech block. The barrel was 40.6 calibres long, which made it 29.9 m (95 ft 0 in) long. But if the barrel was conventional the carriage was not. It was impossible to place the barrel, because of its bulk, over conventional railway track, so the carriage had to span two railway tracks with two main carriage sections each larger than most other railway gun carriages. The barrel was slung between the two carriages, with a long working platform extending from the breech area to a point some way behind the rear of the carriage to enable the ammunition hoists and cranes to lift the projectiles and charges. The projectiles themselves had their own set of superlatives. Two types of projectile were available: one was a concrete-piercing shell no less than 4.3 m (14 ft 1.3 in) long and weighing 7100 kg (15,653 lb); and the other was a high explosive (HE) projectile weighing 4800 kg (10,582 lb). Both were capable of destroying even the largest fortifications. Three possible propellant charges were contained in a brass case.

The assembly of the 80-cm K (E), the first being named 'schwere Gustav' (heavy Gustav) and the second 'Dora') took anything from three to six weeks and entailed using well over 2,000 men. All assembly operations required the use of special gantry cranes which were taken everywhere with the guns, and the number of trucks and carriages needed to carry the ammunition and men, to say nothing of the various workshops and special units attached to the gun, was such that anything up to three or four very long trains were needed to carry them all, apart from the gun assemblies themselves.

Only two 80-cm K (E)s were ever completed, the third falling foul of the heavy air raids that flattened the Ruhr. Only one 80-cm K (E) ever fired a shot in anger, and the whole exercise was really a colossal waste of time, effort, manpower, raw materials, facilities and money at a time when Germany could ill afford such luxuries. The whole idea was a product of Hitler's obsession with the massive, and the equipments were produced purely to pander to this whim. In the end there was not even a gun to show for it, for both guns were scrapped after the war ended: they had been so completely wrecked by their crews that they were good for nothing other than the scrap furnaces.

Specification
Precise calibre: 80.0 cm (31.5 in)
Length of barrel: 28.957 m (95 ft 0 in)
Weight complete: 1350000 kg (2,976,190 lb)
Weight of shell: anti-concrete 7100 kg (15,653 lb) and HE 4800 kg (10,582 lb)
Range: 47100 m (51,510 yards) with HE shell

The 80-cm 'Gustav' in Action

The largest gun ever built had an operational career of 13 days, during which a total of 48 shells were fired in anger. Taking 25 trainloads of equipment, 2,000 men and up to six weeks to assemble, it seems highly unlikely that such a weapon will ever be seen again.

The 80-cm K (E), for all its size and weight, to say nothing of its 'overkill' firepower, went into action on only one occasion. It was originally intended to smash through the extensive Maginot Line forts but when the campaign in the West took place in 1940 the 80-cm K (E) was still in the Krupp workshops at Essen and, in any event, the German army bypassed the Maginot Line altogether. Thus when the 80-cm equipment had completed its gun proofing trials at Hillersleben and its service acceptance trials at Rugenwalde there was nothing for the gun and its crew to do. To justify the labour and effort of getting the huge gun and its entourage into action, the potential target had to justify all the bother involved, and there were no really large fortification lines left in Europe for the gun to tackle. The two major fortification systems, the Sudetenland defences and the Maginot Line, were both in German hands and it seemed that the 80-cm K (E), or 'schwere Gustav' (heavy Gustav) as it became known, was redundant even before it had fired an aggressive shot.

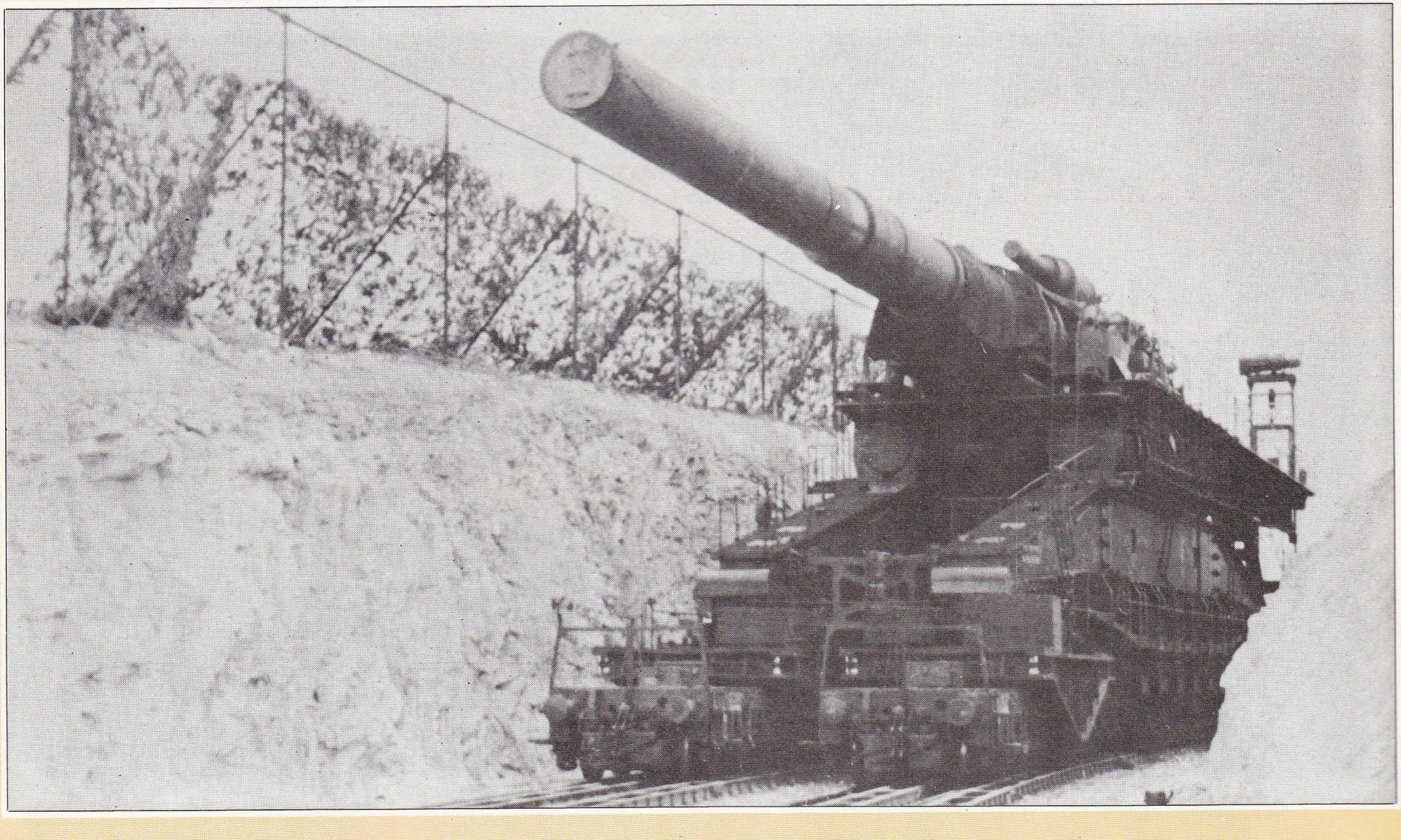
During early 1941 one potential target appeared on the planner's drawing boards and that was Gibraltar. It was planned to assault this isolated fortress at the mouth of the Mediterranean to deny the inland sea to the Allies but as Spain was neutral permission had to be obtained from General Franco to allow German troops to travel through Spain to make the attack. Operational planning for the assault (named Operation 'Felix') got to the stage at which German parachute and glider troops were actively training for the assault before a meeting between Hitler and Franco showed that the wily Spanish dictator was not going to allow himself or his country to become mixed up in a major European conflict. Thus another potential target for the 'schwere Gustav' came and went.

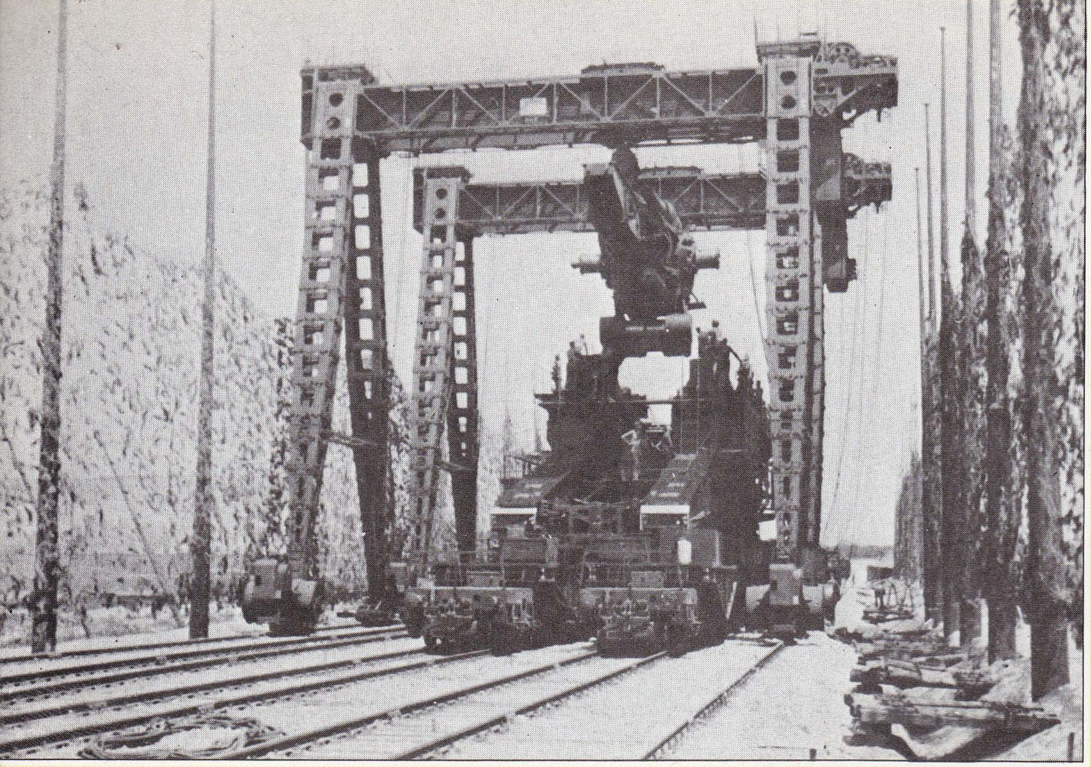
The invasion of the Soviet Union (Operation 'Barbarossa') took place during the second half of 1941 without any assistance from the 80-cm K (E), but by early 1942 the advances of the German army were so rapid and deep that they were on the approaches to the Crimea. Ahead of them lay the naval base of Sevastopol, which was potentially a useful supply port and base for the southern German armies. The need for such a supply base was not very pressing, but what attracted the German operational planners was that Sevastopol was a heavily-fortified port. Around the perimeter of the city was a long chain of fortifications, some of them dating back to the days before the Crimean War of 1854-6 but others more modern, and near the sea coasts there were numerous heavy coastal batteries. The place looked ideal for an investment and siege in the old manner, to be followed up by a huge assault which would demonstrate to the world the power of the German army. Soon the relatively light forces that advanced into the Crimea were supplemented by more and more troops and the German planners started to scour Europe for heavy guns to form an old-fashioned siege train.

For centuries it had been the task of the siege train to bombard a besieged fortress into submission or else open a breach for attacking troops to storm. The Germans decided to repeat this performance on a massive scale. From all corners of Europe the German army assembled a massive gun park of all types of artillery from small-calibre field guns up to pre-World War I large-calibre howitzers. Some were German in origin but others were old captured weapons, and to these were added the modern embellishments of artillery rockets and super-heavy artillery. Into this category came the 60-cm (23.6-in) mobile mortars known as the Karl-Gerät, and it was realized that at last the propaganda coup could be topped by the first operational use of 'schwere Gustav'.

Accordingly the 80-cm K (E) trundled to the Crimea on specially re-laid track. Well ahead of its progress a small army of labourers started to prepare the gun's chosen firing position at Bakhchisaray, a small village outside Sevastopol. Well over 1,500 men under the control of a German army engineer unit dug through a small knoll to form a wide railway cutting on an arc of double track, and the sides of the cutting were raised to provide cover and protection for the gun. On the approaches railway troops laboured to re-lay track and strengthen possible trouble points against the passing of the 'schwere Gustav'. Work on the eventual firing site reached the point where the area behind the curve of firing tracks resembled a small marshalling yard over 1.2 km (0.75 miles) long. It resembled a marshalling yard, and that was exactly what it was. In the area the 25 separate loads that formed the gun and its carriage had

The 80-cm Kanone (Eisenbahn) poking its ponderous barrel around the corner of its firing traverse at Bakhchisaray, the small village from which it bombarded Sevastopol.





Assembling the 80-cm K (E) using the two massive gantry cranes; the part being lowered into place is the cradle along with the trunnions, with the barrel yet to come.

to be assembled and pushed and pulled into the right position and order. Farther to the rear were the accommodation areas where the numerous men of the gun crew lived and prepared for their task.

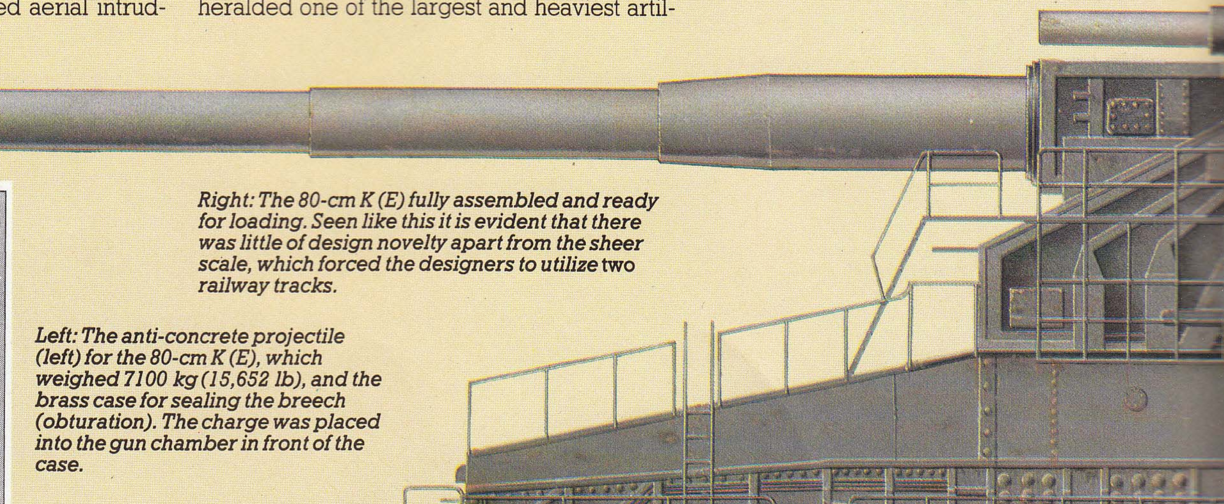
The manpower involved in assembling 'schwere Gustav' was large. Each of the 80-cm K (E)s had a complete detachment of no less than 1,420 men under the command of a full colonel. He had his own headquarters and planning staff, and there was the main gun crew which numbered about 500, most of whom were involved with the complicated ammunition care and handling. Once in action these 500 would remain with the gun, but the rest of the gun's manpower was made up from various units including an intelligence section to determine what targets to engage. Quite a number of troops were involved in the two light anti-aircraft defence battalions that always accompanied the gun when it travelled and also supplied manpower for some assembly tasks. Once the gun was in position these AA battalions warded off unwanted aerial intruders. Two guard companies constantly patrolled the perimeter of the gun position (at one time these companies were Romanian), and at all times there was a small group of civilian technicians from Krupp who dealt with the technical aspects of their monster charge and advised the soldiers. Railway troops and the usual administrative personnel added to the manpower total.

Even using this small army of men it took between three and six weeks to assemble the gun, even using the two 110-tonne cranes that had been designed specially for the task. Just getting the right sub-assembly load into position at the right time was a masterpiece of railway marshalling and planning, but eventually it was all sorted out and by early June 1942, 'schwere Gustav' was ready, along with the rest of the siege train with all their cumbersome carriages and ammunition emplaced ready to hand.

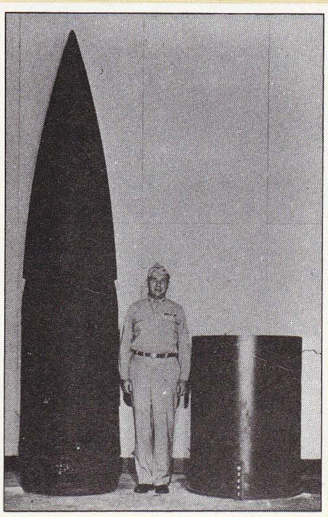
Firing commenced on 5 June 1942. 'Schwere Gustav' was but one voice in a huge choir that heralded one of the largest and heaviest artillery bombardments of all time. By the time Sevastopol fell early in July 1942 it was calculated that no fewer than 562,944 artillery projectiles had fallen on the port, the bulk of them from heavy-calibre guns and howitzers, and this total does not include the noisy storms of artillery rockets and the extra weight of the infantry's own unit artillery. How the civilians of Sevastopol survived it all can now be explained quite easily. They simply went underground. The city knew the bombardment was coming, for not only had their own party and other authorities told them what to expect, but the Germans constantly assailed them with radio broadcasts and other propaganda as to the wrath that was to befall them. By the time the real bombardment started they had already dug deep shelters both underground and in the walls of quarries and hillsides, and there they lived and remained for weeks. A surprising number survived it all.

14 rounds a day

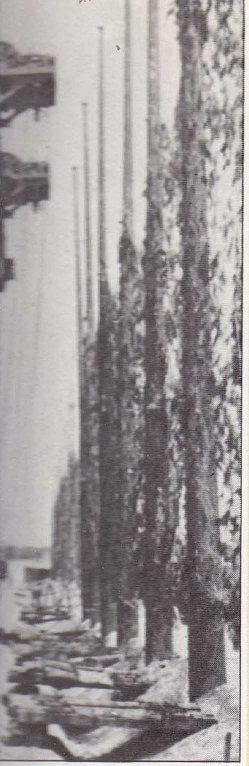
'Schwere Gustav' was not used against civilian targets. Its first targets were some coastal batteries that were engaged at a range of about 25000 m (27,340 yards), and all shots were observed by a special Luftwaffe flight of Fieseler Fi-156 Storchs assigned to the gun. Eight shots were all that were required to demolish these targets, and later the same day a further six shots were fired at the concrete work known as Fort Stalin. By the end of the day that too was a ruin and preparations were made for the following day. It might be thought that 14 rounds in a day was slow going, but in fact it was good going for a gun with a calibre of 80 cm (31.5 in). At best the firing rate was one round every 15 minutes, and more often the interval was longer. The preparation of each shell and charge was considerable and involved several stages including taking the temperature of each charge, accurately com-



Right: The 80-cm K (E) fully assembled and ready for loading. Seen like this it is evident that there was little of design novelty apart from the sheer scale, which forced the designers to utilize two *railway tracks.*



Left: The anti-concrete projectile (left) for the 80-cm K (E), which weighed 7100 kg (15,652 lb), and the brass case for sealing the breech (obturation). The charge was placed into the gun chamber in front of the case.



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'Schwere Gustav' was in action again on 6 June, initially against Fort Molotov. Seven shells demolished that structure and then it was the turn of a target known as the 'White Cliff'. This was the aiming point for an underground ammunition magazine under Severnaya Bay and so placed by the Soviets as to be invulnerable to conventional weapons. It was not invulnerable to the 80-cm K (E), for nine projectiles bored their way down through the sea, through over 30 m (100 ft) of sea bottom and then exploded inside the magazine. By the time 'schwere Gustav' had finished its ninth shot the magazine was a wreck and to cap it all a small sailing ship had been sunk in the process.

The next day was 7 June, and it was the turn of a target known to the Germans as the Südwestspitze, an outlying fortification that was to be the subject of an infantry attack. After seven shots the target was ready for the attentions of the infantry, and the gun crews were then able to turn their attentions to some gun maintenance and a short period of relative rest until 11 June. On that day Fort Siberia was the recipient of a further five shells, and then came another lull for the gun crews until 17 June, when they fired their last five operational shells against Fort Maxim Gorki and its attendant coastal battery. Then it was all over for 'schwere Gustav'.

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Right: The ammunition hoists for the 80-cm K (E) ammunition, with the projectile (here HE) on the left and the charge with its case on the right – both are carried on special trolleys.

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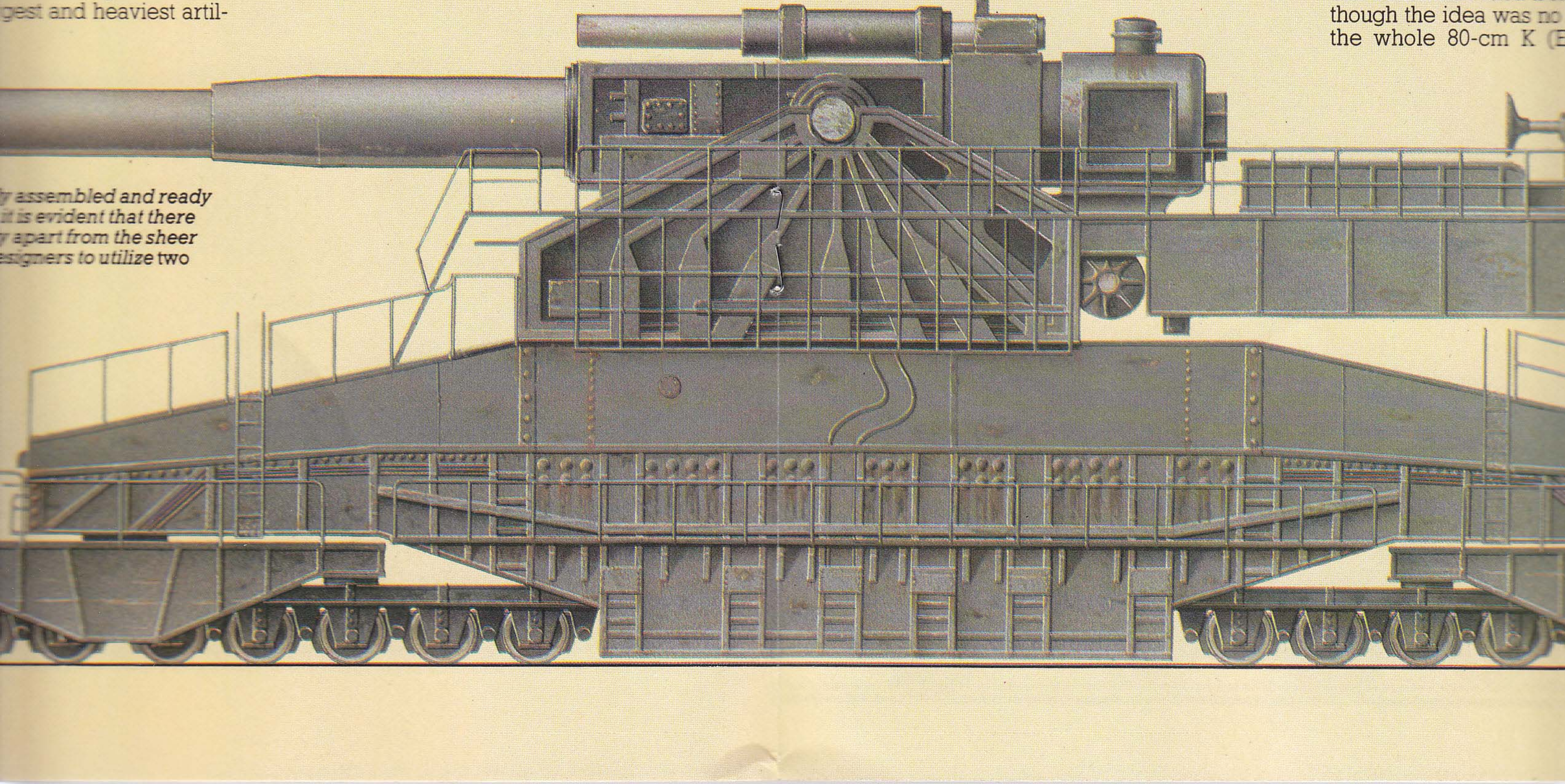

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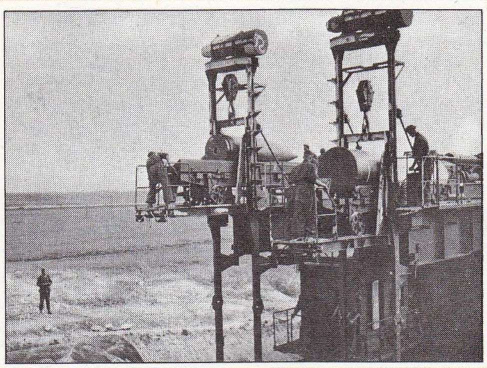
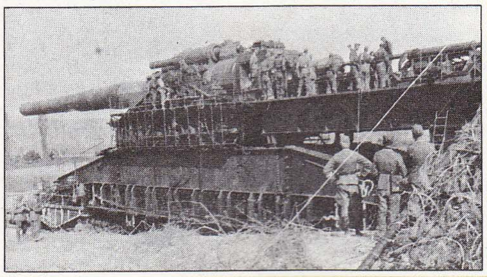
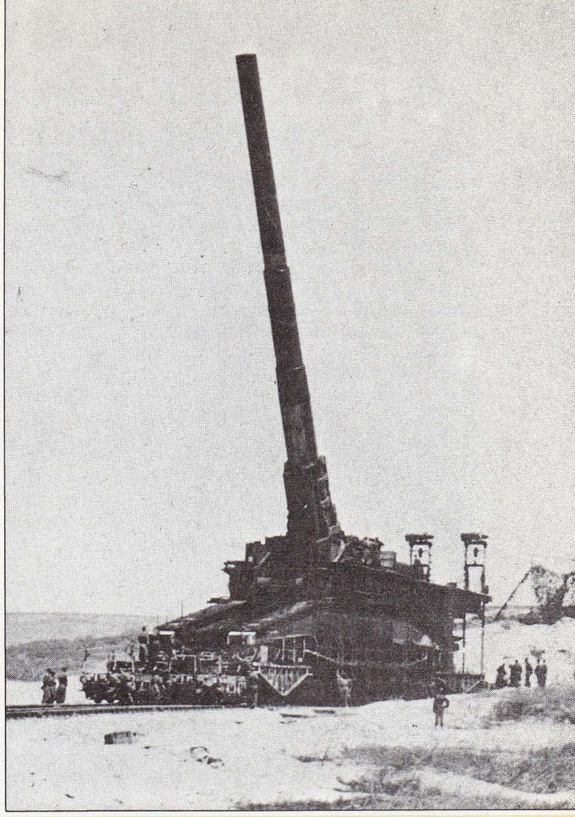


Right: The ammunition hoists for the 80-cm K (E) ammunition, with the projectile (here HE) on the left and the charge with its case on the right – both are carried on special trolleys.



The 80-cm K (E) preparing for a shoot at Bakhchisaray, with the rammer behind the barrel preparing to push a projectile into the breech and with numerous men in attendance.



The 80-cm K (E) at its maximum elevation of just over 65 degrees. This picture was probably taken during trials at the Rugenwalde ranges in Germany, where the majority of the 80-cm rounds were fired.

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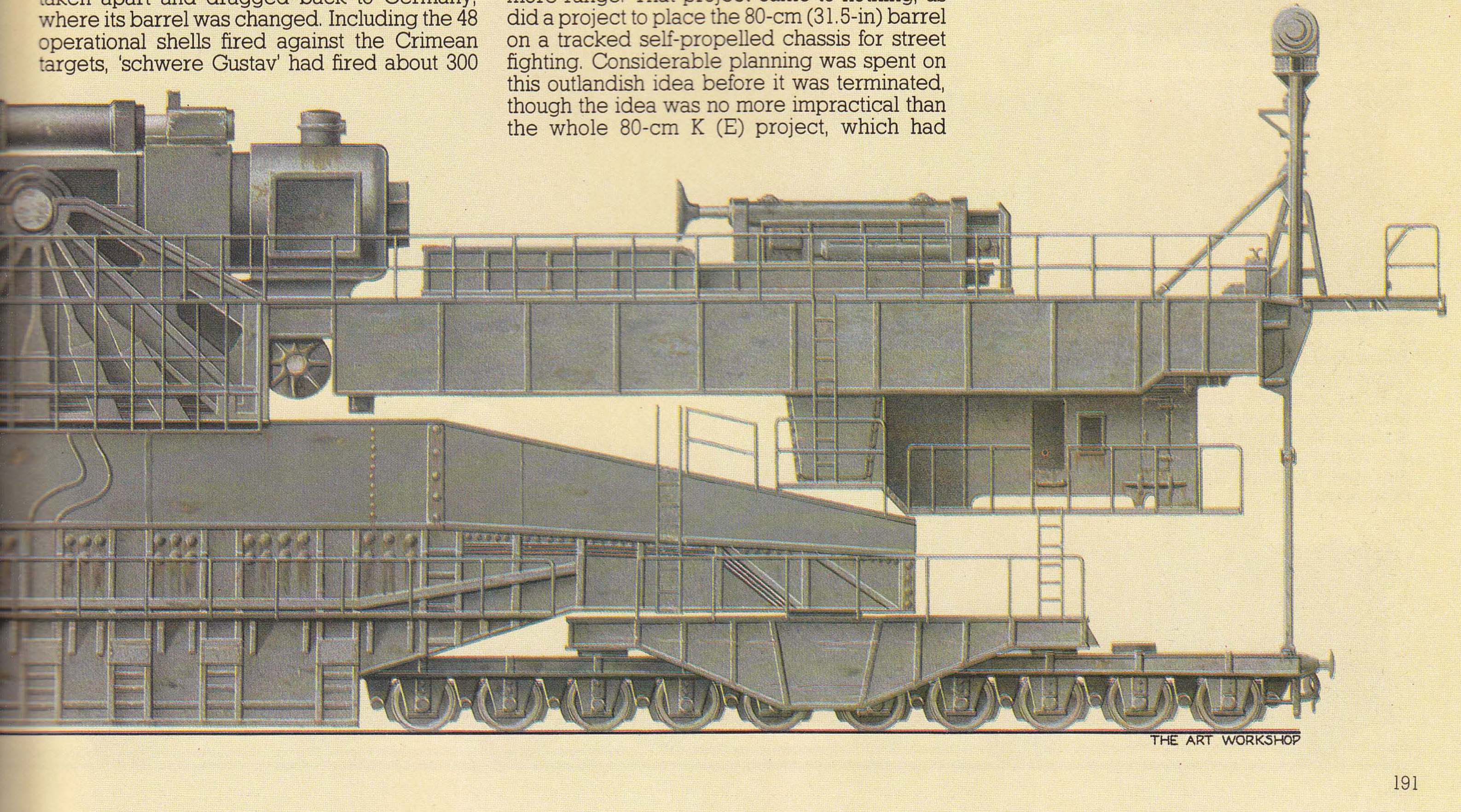
There was nothing more for 'schwere Gustav' to do. It spent some time on the Rugenwalde ranges firing the odd demonstration projectile and being used for the development of some long-range concrete-piercing projectiles, and at one point there was talk of replacing the 80-cm (31.5-in) barrel with a 52-cm (20.5-in) barrel to provide the weapon with more range. That project came to nothing, as did a project to place the 80-cm (31.5-in) barrel on a tracked self-propelled chassis for street fighting. Considerable planning was spent on this outlandish idea before it was terminated, though the idea was no more impractical than the whole 80-cm K (E) project, which had absorbed immense manpower and facilities of all kinds, all to fire 48 rounds at antiquated Crimean fortifications.

By May 1945 'schwere Gustav' was scattered all over central Europe. The carefully-planned trains had been attacked constantly by Allied aircraft and what parts were still in one piece were wrecked by their crews and left for the Allies' wonderment. Today all that is left of 'schwere Gustav' and 'Dora' are a few inert projectiles in museums.



THE ART WORKSHOP

German armoured trains

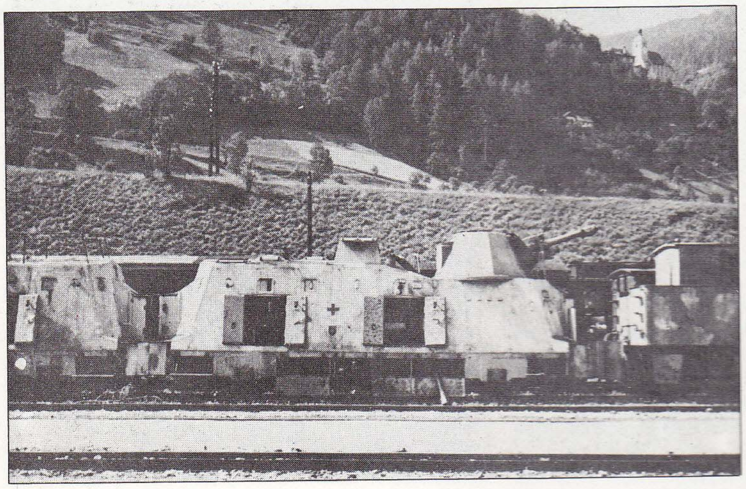
Almost as soon as the 'new' German army began to rearm during the early 1930s, high on the list of priorities were armoured trains. Their numbers and importance grew over the next decade until by 1943 there were 80 in service. Known as **Eisenbahn Panzerzug** (armoured railway train), the type was used mainly on the Eastern Front after 1941, and only a few were ever deployed in the West.

The main function of many of the German armoured trains was anti-partisan activity on the vast expanses of the Soviet steppes. For this purpose the trains were equipped with varying types of armament and other equipment. The main component of each train was usually a number of twin-axle waggons each with large slab-sided superstructures mounting turrets that might be anything from converted tank turrets to specialized turrets mounting converted artillery pieces. Added to these armoured waggons would be more flat-bed trucks carrying anything from more converted tank turrets to field artillery pieces lashed to the flat bed. A variation on the flat-bed waggon theme was an open-sided waggon carrying a small tank, usually of a type too ancient or light for anything other than anti-partisan operations. In action these light tanks could be rolled off their waggons and taken directly into action. Each train also had its own anti-aircraft armament, usually in the form of quadruple 20-mm cannon mountings. On the simplest versions these were simply mounted or bolted onto flat-bed waggons, but other variations were protected by armoured turrets or simpler concrete walls. All manner of armament was used on these trains, ranging from the latest type of anti-tank gun to captured artillery and AFV turrets of all types and sizes. Every train had its own staff which included self-defence infantry, signallers, railway repair and maintenance staff and specialist artillerymen.

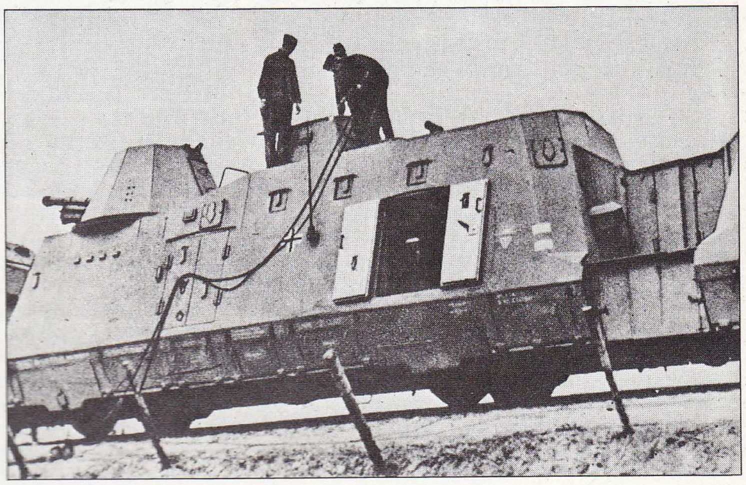
To supplement its 80 armoured trains the German Army also impressed into service ex-Czech and Polish armoured trains, and ex-Soviet trains were later added to the numbers. In Italy locally-produced trains often ended up in German use, including one famous example that had once been presented to Mussolini by Hitler himself. Numerous examples of a type of small self-contained armoured units known as the **Panzerdraisine** (armoured trolley) were later produced for general patrol duties and these were of two main types. One was armed with a single PzKw IV tank turret with a short-barrel 7.5-cm (2.95-in) gun and the other mounted two PzKw IV tank turrets each with a long-barrel 7.5-cm (2.95-in) anti-tank gun. These light self-propelled units were mainly employed on internal patrol duties.

In a slightly different category and not always armoured were the special German anti-aircraft (Flak) trains that were used inside the Reich to bolster local defences during some of the more prolonged Allied air offensives against major German cities such as Berlin and Hamburg. These trains generally mounted 8.8-cm (3.46-in) guns but also had lighter weapons for close defence.

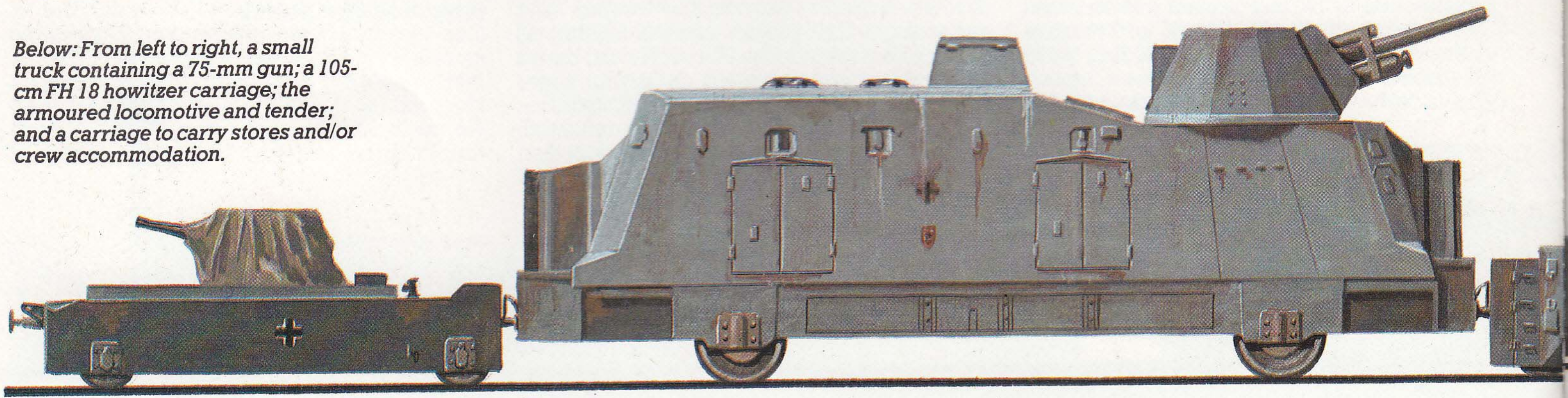
One carriage of a German armoured train armed with a turret containing a 10.5-cm FH 18(M) turret. Both crew access hatches are open and the interior contains ammunition and stores racking.



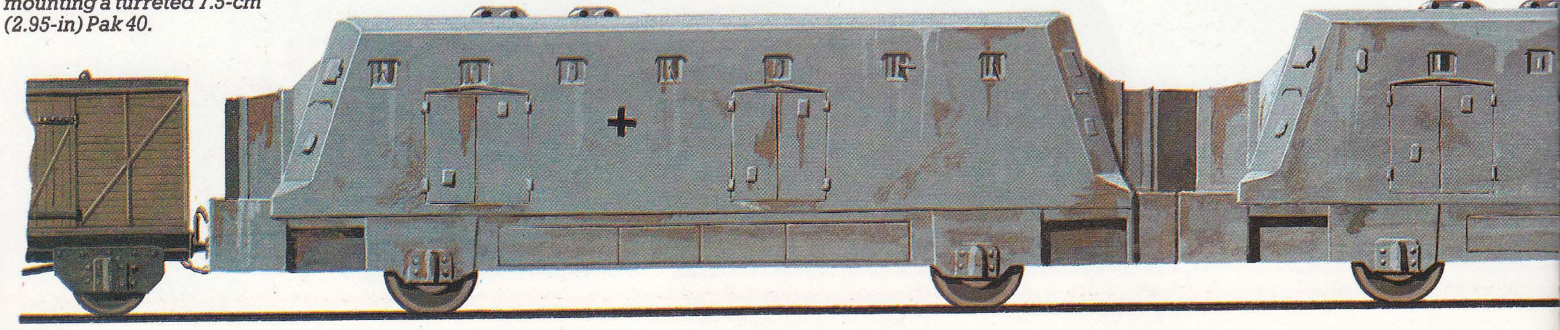
The other side of a carriage with a 10.5-cm (4.13-in) FH 18(M) turret, with the crew apparently connecting a cable for battery-charging. Note the armoured section connecting with the next carriage.

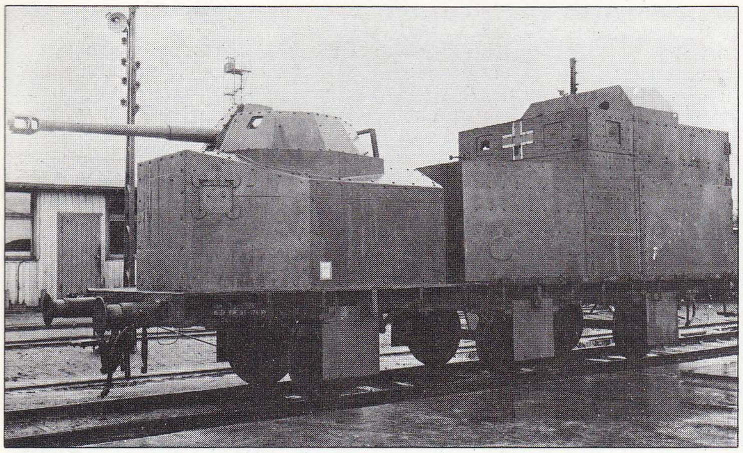


Below: From left to right, a small truck containing a 75-mm gun; a 105-cm FH 18 howitzer carriage; the armoured locomotive and tender; and a carriage to carry stores and/or crew accommodation.

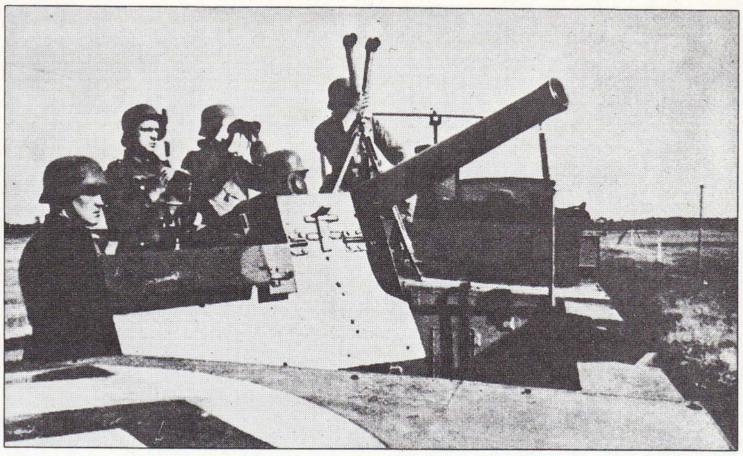


Below: From left to right, following the unarmoured truck is a personnel carriage, armoured and with weapon slits; a carriage with a turret-mounted 2-cm Flakvierling 38 anti-aircraft gun; and a carriage mounting a turreted 7.5-cm (2.95-in) Pak 40.

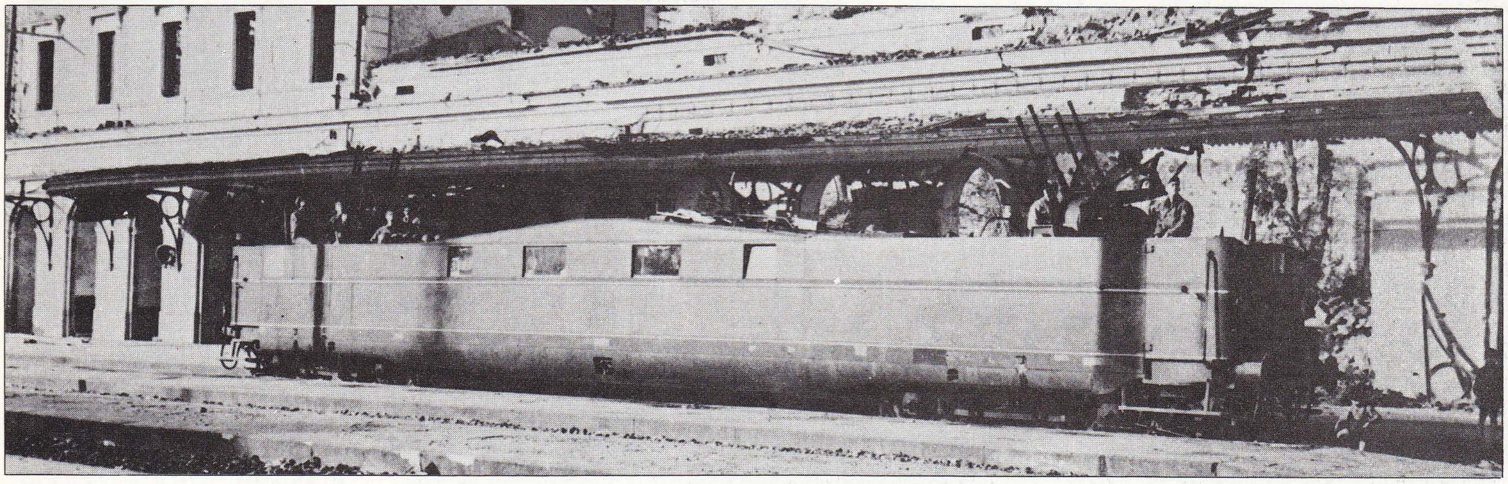




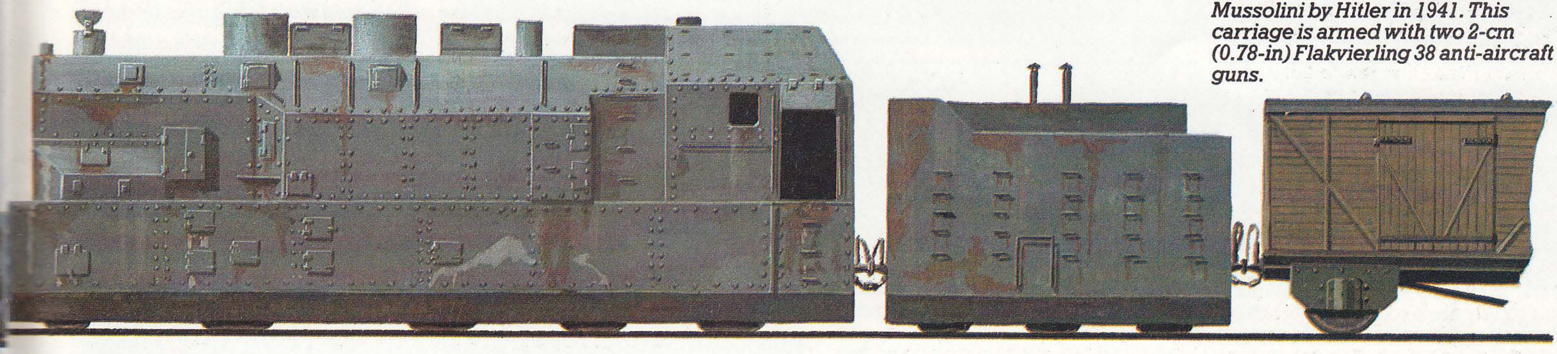
Above: A 7.5-cm (2.95-in) Pak 40 anti-tank gun in a special turreted carriage; few of these were produced after 1941 as the Germans made use of captured equipment.

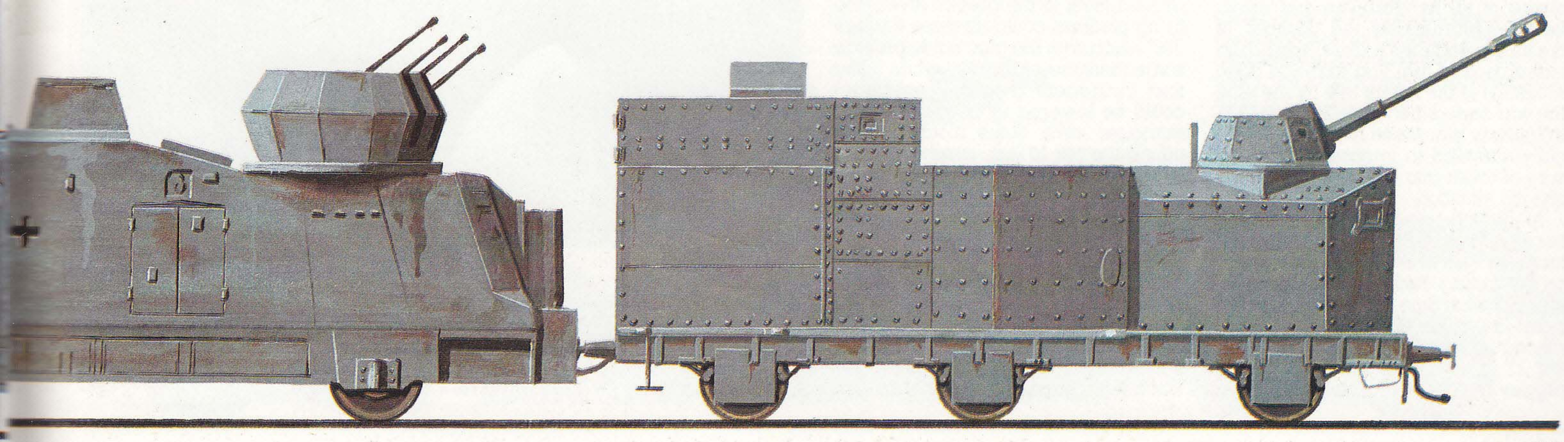


Above: An unusual photograph showing a posed German crew manning an open truck, mounting what appears to be a short 75-mm gun – note the rangefinder in the background.



Above: One of the carriages from the special armoured train presented to Mussolini by Hitler in 1941. This carriage is armed with two 2-cm (0.78-in) Flakvierling 38 anti-aircraft guns.





POLAND

Polish armoured trains

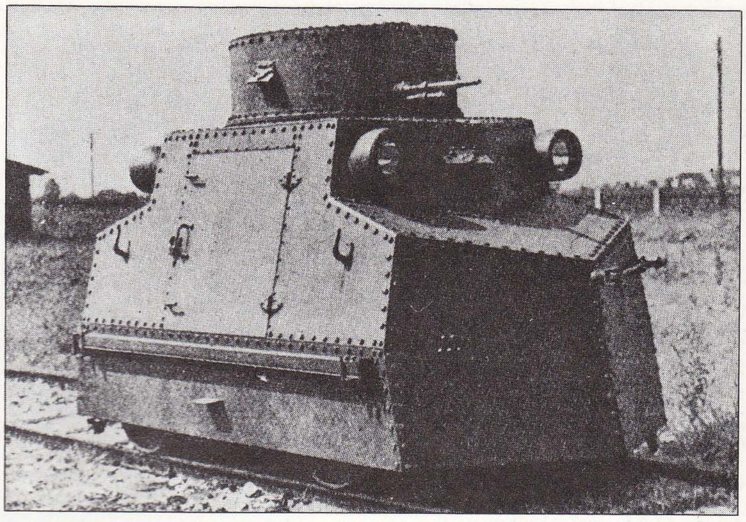
Almost as soon as Poland was established as a nation in 1919, the new Polish army started to accumulate a number of types of armoured train with which to defend its exposed borders. The trains were initially used to take troops and heavy armament to any particular front or locality as and when required, for it was impossible to post troops to cover every potential border crossing point, especially on the wide plains of the eastern Polish frontier with the Soviet Union. In time some of these early armoured trains were withdrawn and replaced by more formal designs intended specifically as armoured trains rather than merely a collection of protected railway waggons.

Typical of these new equipments was the **Pociag Pancerny nr 11** (PP nr 11) and named 'Danuta'. When complete this train consisted of two armed waggons, an accommodation and control waggon equipped with radio, and an armoured locomotive. To these could be added two flat-bed waggons, one at the front and one at the back, which had no function other than to protect the train proper from the possible effects of mines laid under the tracks and fired by wheel pressure. Thus, from the front, such a train would comprise a flat-bed waggon, one of the two armed waggons, the control carriage (also armoured), the armoured locomotive, the other armed waggon, and the second flat-bed waggon. The armed waggon was a four-axle design with two axles at each end. At the ends were two circular turrets, one mounting a 100-mm (3.94-in) howitzer of Austro-Hungarian origins and the other a 75-mm (2.95-in) gun. A small central turret mounted a 7.92-mm (0.31-in) machine-gun.

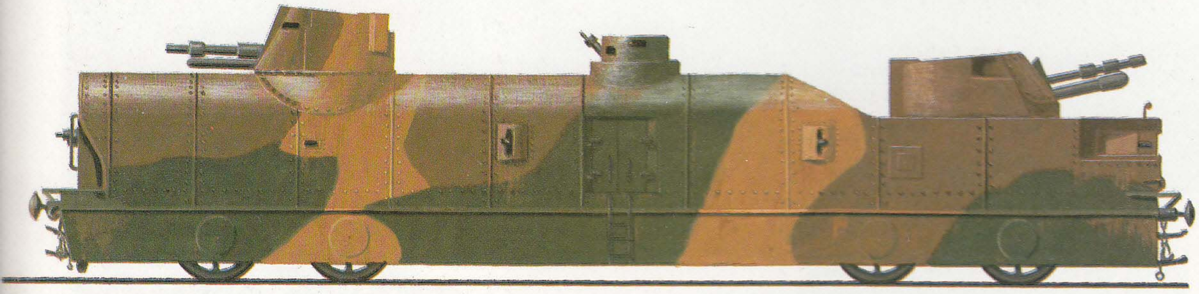
The 'Danuta' was but one of many Polish armoured trains still in service in 1939 when the Germans invaded. Each of the Polish armoured trains had its own name, usually of a Polish folk or national hero such as 'Paderewski', 'Grozny', 'General Sosnkowski' or 'Marszalek'. To these were added a number of improvised trains that were hurriedly formed in 1939, usually by simply adding steel plates to existing railway rolling stock. No two examples of these armoured trains appear to have been alike other than the fact that they nearly all had two-turret waggons somewhere in their formation. Again, no two of these twin-turret waggons were identical in design although most had one 100-mm (3.94-in) turret and one 75-mm (2.95-in) turret with a machine-gun of some form or another in the small central turret. There were also a number of smaller twin-axle waggons with single turrets having 75-mm (2.95-in) guns and firing ports or small turrets for machine-guns. To add to the number of types in service there were also small waggons with their own truck-type engines carrying a small machine-gun turret. Typical of these was the 'Tatra' which mounted a Hotchkiss machine-gun.

One Polish innovation was the adaption of railway waggons for the carriage of light tanks, often as part of armoured trains. These could carry either the light Renault M1917 tank or the little TKS tankettes that were little more than machine-gun carriers.

For all their gun power and degree of design sophistication, nearly all the Polish armoured trains lacked one key weapon, and that was some form of anti-aircraft armament. In 1939 this proved to be a serious drawback for in the face of Luftwaffe air supremacy the Polish armoured trains were either unable to move or were attacked when they attempted to do so. Many of them were destroyed by air attack and the few left were taken over by the Germans, at first for internal security duties but later in the Soviet Union on anti-partisan operations.



The Polish 'Tatra' armoured rail car, built in 1936 and armed with a 7.92-mm (0.31-in) machine-gun; it had a top speed of 45 km/h (28 mph) and a range of 700 km (435 miles).



One of the armoured carriages from the Polish 'Danuta' armoured train with a turreted 100-mm howitzer on the left, a 7.92-mm (0.31-in) machine-gun in the centre and a turreted 75-mm field gun on the right. The few Polish armoured trains not destroyed were taken over by the Germans.

UK

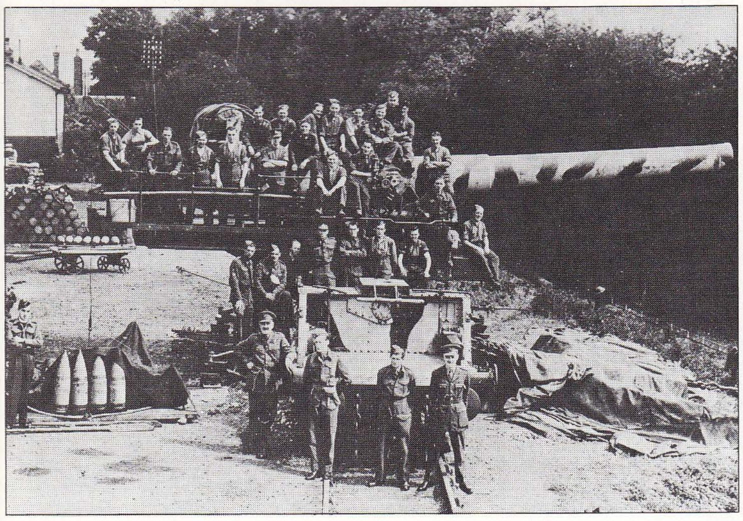
British 9.2-in railway guns

When the British army started to demand railway guns in 1915, the well-established 234-mm (9.2-in) coastal defence gun was an obvious candidate for consideration. Not only did production facilities exist for the gun, but there were also well-established ammunition supply lines on tap and, probably more important at the time, there were trained gunners already in service who both knew the gun well and were aware of all its attributes and drawbacks. Unfortunately the urgency of the times produced a large crop of odd extemporized gun and carriage combinations to the extent that by the time the war ended the whole 234-mm (9.2-in) railway gun scene had to be drastically curtailed to impose some measure of order into what had become a chaotic situation.

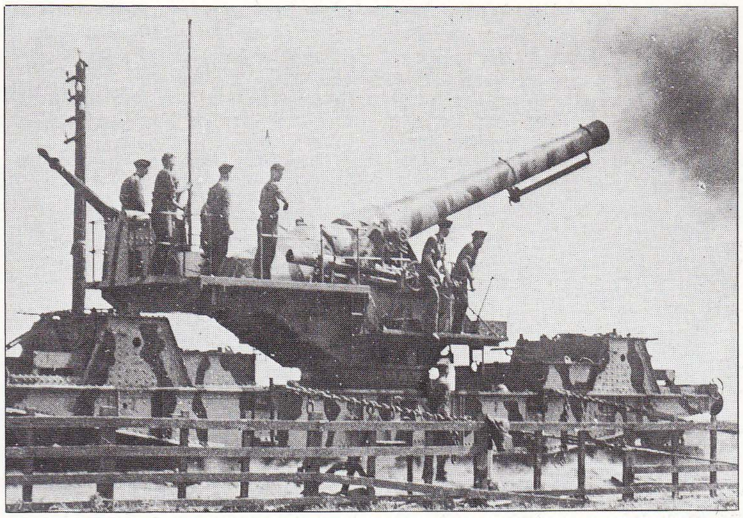
In the end only one type of gun and carriage was retained for possible future use. This was the **9.2-in Gun Mk 13 on Mounting Railway Truck Mk 4**, which by that time was a very different beast from the original coastal guns placed on simple flat-bed trucks. The Mk 13 gun was purpose-built for the railway gun task and was a very good specimen of its type. The carriage had three axles fore and aft supporting a flat steel-bedded platform, at the centre of which was a large turntable. On this turntable were mounted the gun mounting proper and the firing platform. As with other designs the firing platform for the gun crew extended well to the rear of the breech and mounted an ammunition-handling crane to raise the heavy shells from ground level to the breech level. The firing platform could traverse through 360° along with the gun, but to provide some measure of stability when firing four outriggers (two on each side) could be lowered to the ground from outrigger arms. Some mountings retained the **Mk 10** gun, which was kept in service long after 1918 to the extent that it was still around in 1939, but the Mk 13 gun was the preferred type.

Between the wars the 234-mm (9.2-in) railway guns were little used apart from the odd demonstration shoot on special occasions. Most were wrapped and coated in grease, and then placed in strange corners around the United Kingdom, to the extent that when war broke out in 1939 no-one appeared to know where they all were. The equipments had to be searched out by special parties, who found them in some very odd places indeed, but by early 1940 enough had been found to equip the British army's re-

A 9.2-inch howitzer is brought into action on its field carriage in 1917, clearly showing the advantages of mounting such heavy pieces on railway mountings.



A 9.2-inch gun and its full detachment 'somewhere in the Dover area' during 1941. Not all these men would actually be on the gun in action.



A 9.2-inch railway gun firing during a practice shoot at the School of Railway Artillery at Catterick. The mounting is a Mk 5; note the extra chains used to restrain the recoil.

formed School of Railway Artillery at Catterick, an establishment mainly staffed by old railway gunners from World War I. They provided the crews and the equipment for two 9.2-in railway guns that were sent to France to back up the British Expeditionary Force, but there was no ammunition to send with them. The outcome of this sorry state of affairs was that both guns were unable to contribute anything to the conflict, and were captured near Dunkirk during May 1940.

After Dunkirk the remaining 234-mm (9.2-in) railway guns were moved south to the Dover area, where they spent the next few years as part of mobile anti-invasion defence. From time to time they were fired to impress visiting dignitaries, but they could do little else and by 1944 they had been withdrawn, their crews sent to other tasks, and eventually all were scrapped.

Specification

Precise calibre: 233.7 mm (9.2 in)
Length of barrel: 8.509 m (27 ft 11 in)
Weight complete: 88400 kg (194,885 lb)
Weight of shell: 172.4 kg (380 lb)
Range: 20665 m (22,600 yards)

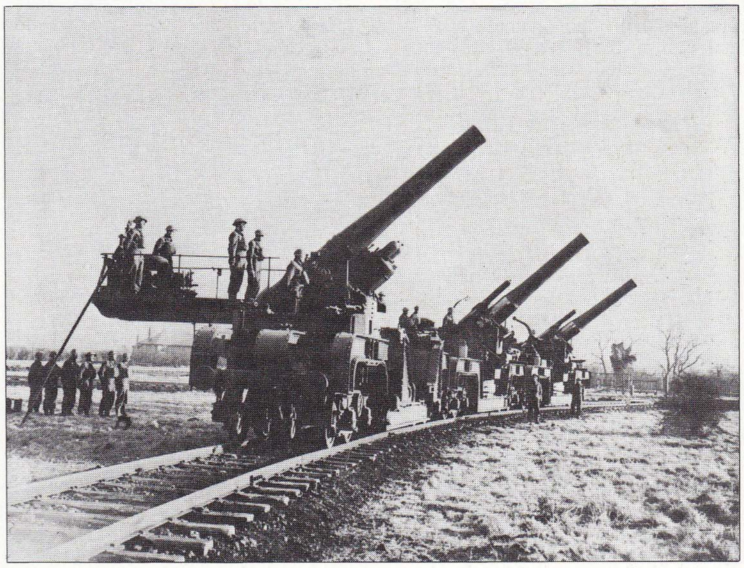
UK

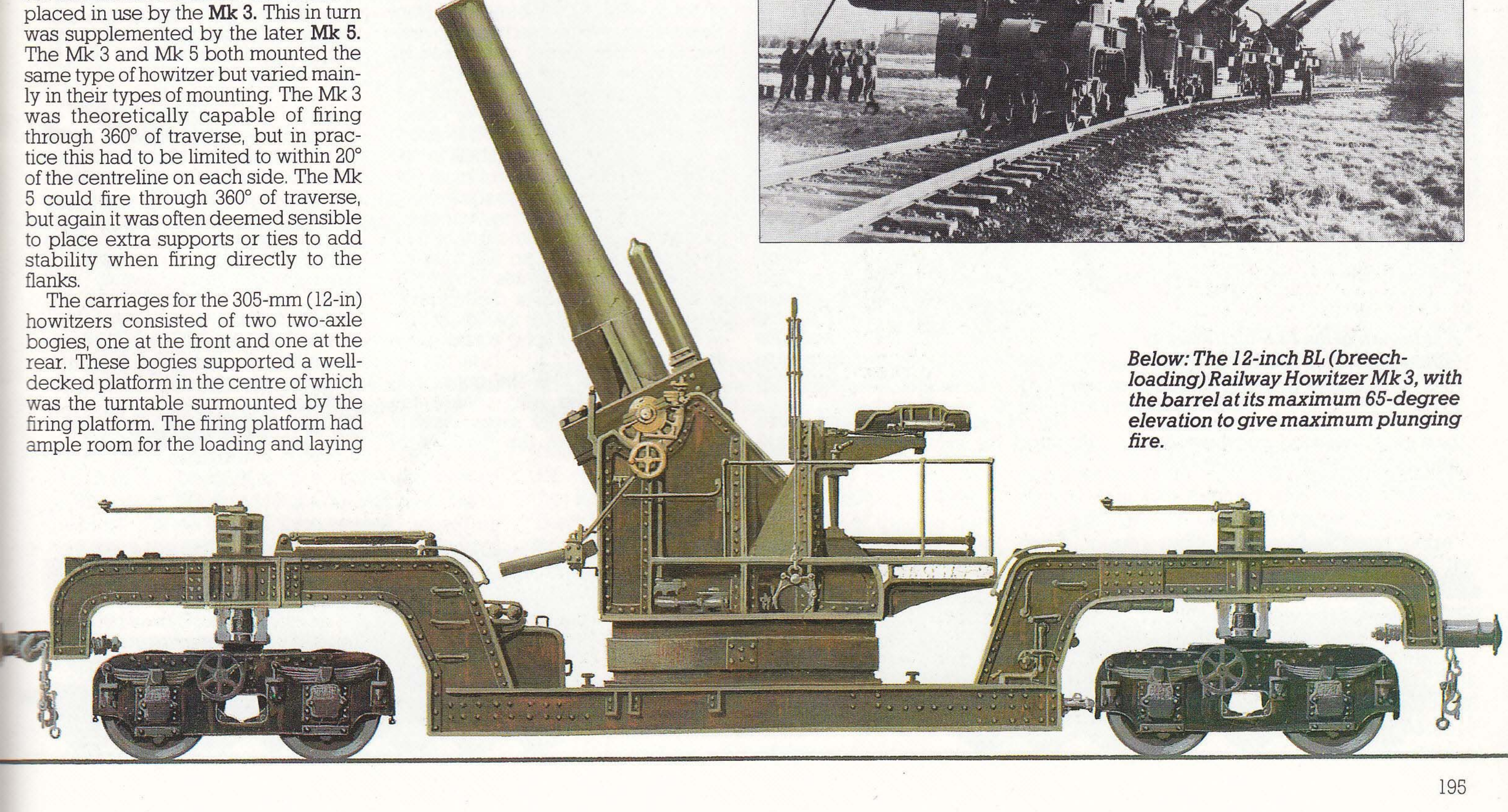
British 12-in railway howitzers

While the tale of the 305-mm (12-in) railway howitzers followed the same general lines as that of the 234-mm (9.2-in) railway guns the overall story was much simpler, at least as far as the World War I period was concerned. The first model was the **12-in Howitzer on Mounting Railway Truck Mk 1,** produced by the Vickers Elswick company, but this design had some in-service limitations and it was soon replaced in use by the **Mk 3.** This in turn was supplemented by the later **Mk 5.** The Mk 3 and Mk 5 both mounted the same type of howitzer but varied mainly in their types of mounting. The Mk 3 was theoretically capable of firing through 360° of traverse, but in practice this had to be limited to within 20° of the centreline on each side. The Mk 5 could fire through 360° of traverse, but again it was often deemed sensible to place extra supports or ties to add stability when firing directly to the flanks.

The carriages for the 305-mm (12-in) howitzers consisted of two two-axle bogies, one at the front and one at the rear. These bogies supported a well-decked platform in the centre of which was the turntable surmounted by the firing platform. The firing platform had ample room for the loading and laying

Right: An impressive row of three 12-inch railway howitzers at the School of Railway Artillery, 1940. These howitzers were moved to the Dover area, where they remained until 1943.





Below: The 12-inch BL (breech-loading) Railway Howitzer Mk 3, with the barrel at its maximum 65-degree elevation to give maximum plunging fire.

members of the crew and the usual ammunition-hoisting jib was provided at the rear. The long loading platform also acted as a counter-weight to balance the forward weight of the barrel.

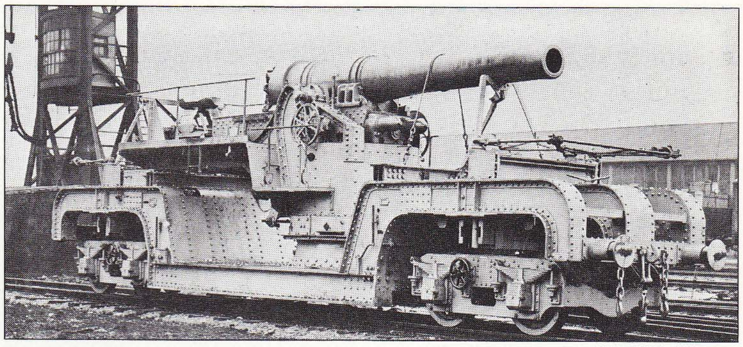
By 1918 only the Mk 3 and the Mk 5 were still in use and these were almost immediately placed into store, where they were forgotten about until 1939. They once more came to light after the usual search and became part of the equipment of the army's School of Railway Artillery at Catterick Camp. From there four complete equipments were sent to France to support the British Expeditionary Force, but they proved to be of no avail against the rapid tank attacks of the German army and all four of them fell into German hands. At least two of them appear to have been 'spiked' to prevent any further use and in this the gunners' efforts appear to have been successful for the type, although appearing in a list of captured equipment, does not appear to have been used by the Germans.

Back in the United Kingdom, the remaining 305-mm (12-in) railway howitzers moved south to the English Channel coast to become part of the mobile defences but like the 234-mm (9.2-in) guns alongside which they served, they had little to do other than be rolled out to impress visiting VIPs. By 1944 there were no such equipments left in the Channel area for the threat of invasion had long since diminished. Most were put back into their protective wraps and their crews were dispersed to other duties. When the war ended they were scrapped.

Specification

Mk 3

Precise calibre: 304.8 mm (12 in)
Length of barrel: 5.715 m (18 ft 9 in)
Weight complete: 61976 kg (136,630 lb)
Weight of shell: 340 kg (750 lb)
Range: 13715 m (15,000 yards)



Specification

Mk 5

Precise calibre: 304.8 mm (12 in)
Length of barrel: 5.715 m (18 ft 9 in)
Weight complete: 77220 kg (170,240 lb)
Weight of shell: 340 kg (750 lb)
Range: 13715 m (15,000 yards)

A factory-fresh 12-inch BL Mark 5 Railway Howitzer, the last 12-inch howitzer design used throughout the early days of World War II. They were of no use in France, faced with the rapid German tank advance.

UK

British 13.5-in railway guns

The story of the British **13.5-in railway guns** began in 1916, when it was decided to mount 356-mm (14-in) naval gun barrels onto a new type of railway mounting to provide the British army in France with a really powerful long-range gun of the type the French army was just beginning to bring into service. The 356-mm (14-in) naval gun barrels came from a batch originally intended for export to Japan, and the first of these was mounted onto its carriage at the Elswick Works at Newcastle-upon-Tyne during late 1917. It was early 1918 before the first two equipments were sent to France, one named 'Boche-Buster' and the other 'Scene-Shifter'. Once in France both did sterling work until the war ended.

Back in the United Kingdom during 1919 the two guns were sent off to store, 'Scene-Shifter' being hidden away at an ordnance depot at Chilworth minus its barrel. The same fate awaited the other two carriages that had been ordered, both of which were stored away without their intended barrels as soon as they were finished. There they remained until 1940 when the need for some form of counterbombardment gun was urgently needed in the Dover region to deal with the long-range batteries being constructed in the Pas de Calais area. The Prime Minister, Winston Churchill, took a personal hand in the measures that provided a new role for the World War I gun carriages and he personally kept in touch with all stages of the guns' return to service.

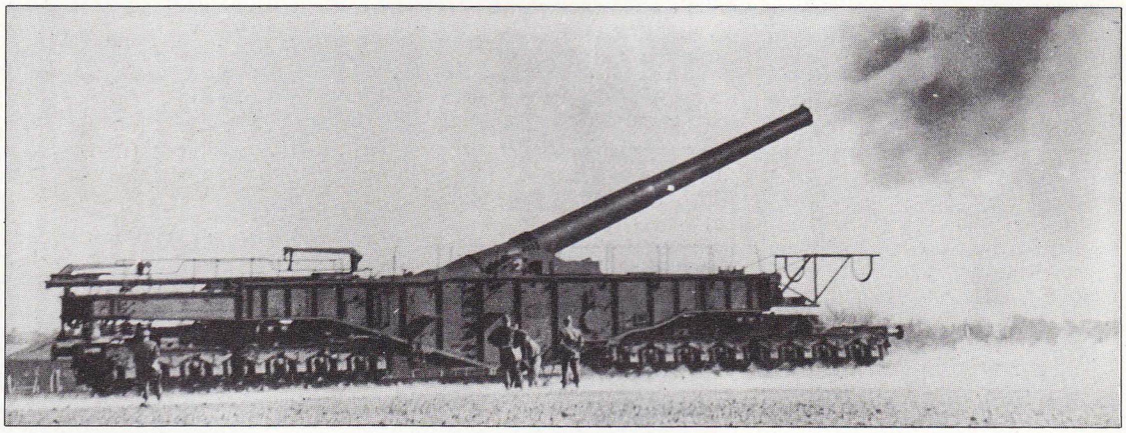
The 356-mm (14-in) guns that were originally intended for the carriages had been declared obsolete in 1926 and had subsequently been scrapped. Replacement barrels were sought and found, tucked away in Royal Navy stores, in the form of a number of 343-mm (13.5-in) guns taken from the old 'Iron Duke' class of battleship. These barrels were in reasonable condition and their dimensions were such that they could be fitted into the 356-mm (14-in) railway carriages without too much trouble. Thus the conversions were made and the old carriages were provided with a thorough renovation and update.

The 343-mm (13.5-in) guns were manned by men from the Royal Marines Siege Regiment and the first of them, HMG (His Majesty's Gun) 'Scene-Shifter' was ready in November 1940. Soon after it was joined by HMG 'Piece-Maker' and HMG 'Gladiator'. Distributed along various railway lines in the hinterland of Dover, these three guns then went into action at times, firing the odd shell in the general area of the Pas de Calais. Unfortunately the fall of these shells could only rarely be observed so their effectiveness was often uncertain. The three guns also had an anti-invasion role as their considerable ranges enabled them to cover a considerable length of coastline, but thankfully they were never called upon to undertake that task.

In November 1943 the guns once more came under army control and went into training for some possible task involved with the invasion of Europe. It was intended that they would follow up the invasion forces to knock out the Pas de Calais defences from the rear, but in the event they were not required. The war ended with the three guns still in the United Kingdom, and in 1947 they were finally declared obsolete and scrapped. Today nothing of them remains.

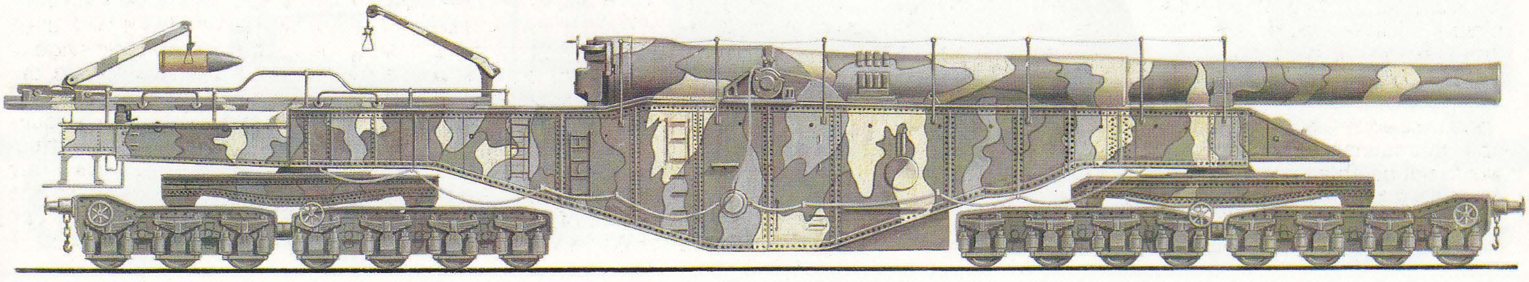
Specification

Precise calibre: 342.9 mm (13.5 in)
Length of barrel: 15.90 m (52 ft 2 in)
Weight complete: 244590 kg (539,920 lb)
Weight of shell: 567 kg (1,250 lb)
Range: 36,575 m (40,000 yards)



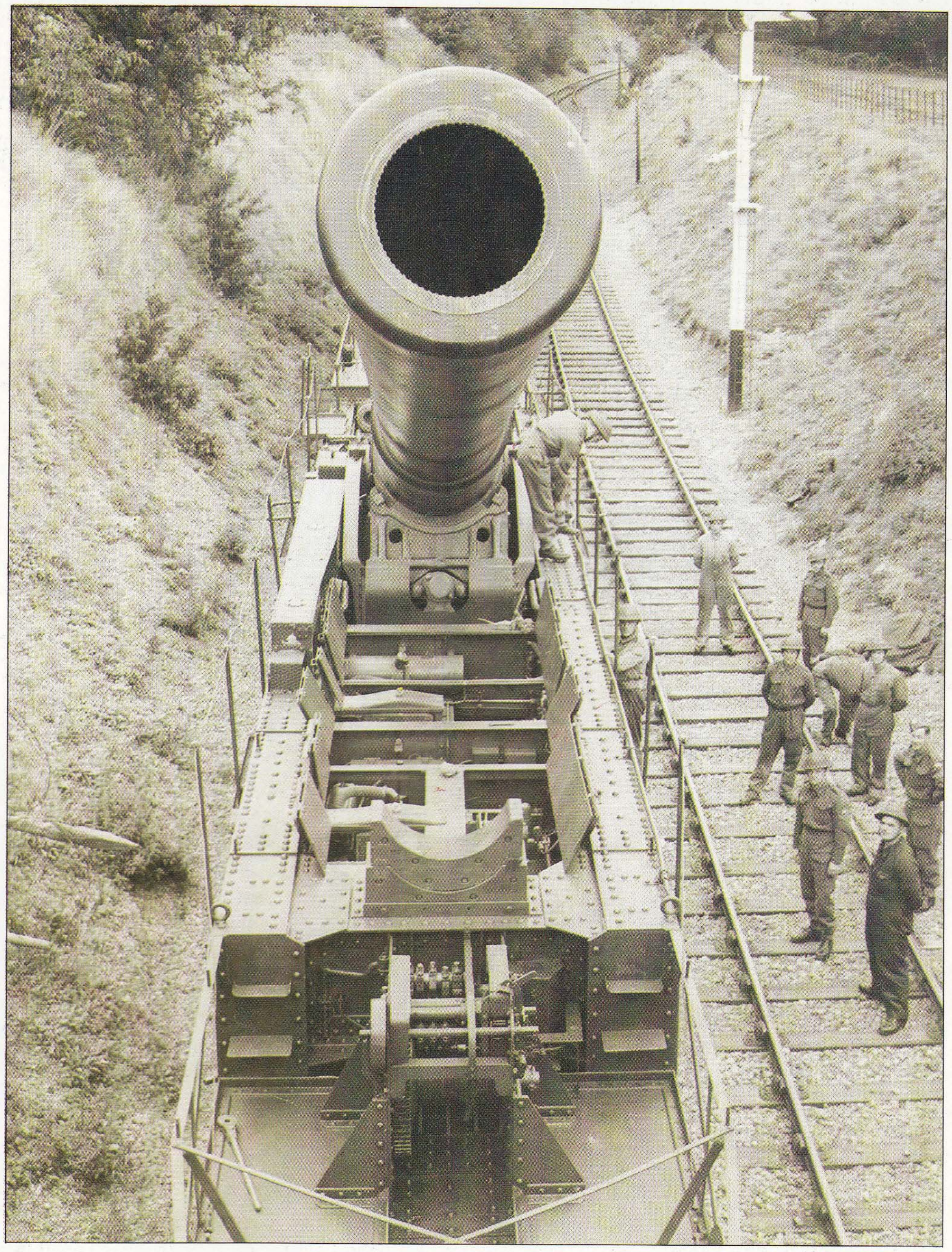
One of the three 13.5-inch railway guns firing. The background suggests that this was a shoot over the Catterick ranges rather than the general Dover area.

A side view of the 13.5-inch Railway Guns ready for loading. The design of this carriage was the last ever produced for a British railway gun, and was considered to be among the best ever produced anywhere, but only a few were produced in 1918 and none after that.



The Dover Railway Guns in Action

Following the fall of France, and in expectation of an eventual German invasion of England, defences in the Dover area were beefed up by old railway guns taken out of storage. In addition, the longer-range guns had the task of countering the cross-Channel weapons deployed in the Pas de Calais by the Wehrmacht.



A magnificent photograph of 'Boche-Buster', the 18-inch railway howitzer based at Bekesbourne on the Eltham Valley Light Railway behind the Dover coastal area. This howitzer was the only one of its type ever mounted on a railway carriage, or indeed any other carriage.

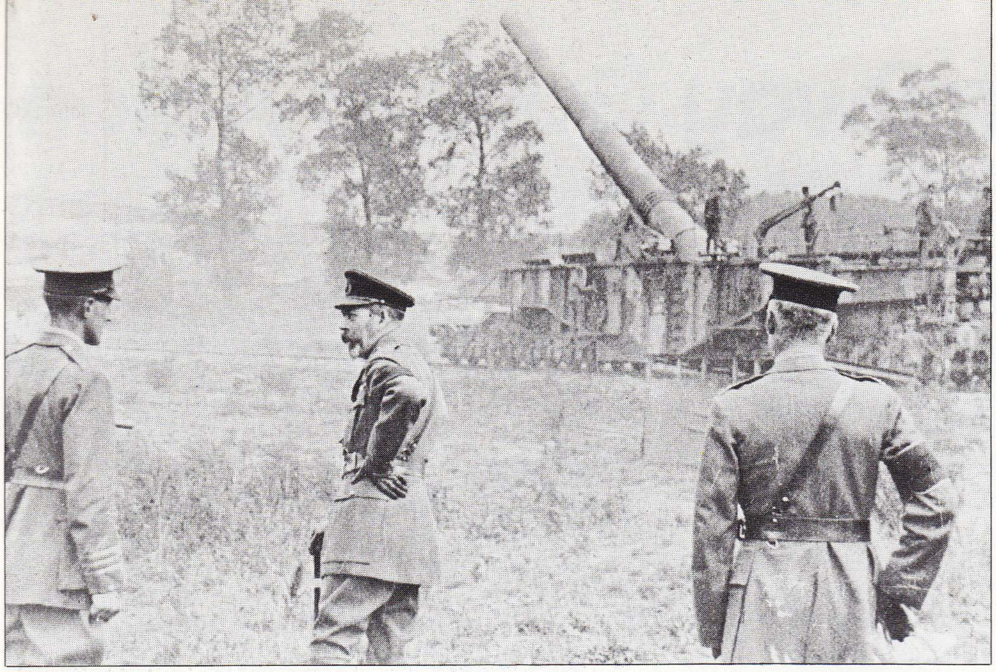
The war of the Dover railway guns was a curious one with the troops involved, mainly Royal Marines trained to operate naval gun turrets on board ships, never quite knowing if they were railwaymen or soldiers. Their lives consisted of sleeping and eating in railway carriages and trucks, travelling to their work in more railway carriages and, once they were on their action posts, working once more above railway tracks. Their lives were spent looking after rolling stock and continually cleaning, oiling and greasing railway equipment. Only the long gun and howitzer barrels that lay along the converted trucks and special gun carriages reminded them that they were at war.

Most of the British army personnel involved had come south from the cold wastes of the Catterick Camp area, where they had been trained by medal-ribbon-wearing veterans of World War I. Most of the instructors had been involved with railway artillery during that conflict and they were involved yet again, some of them with the very same guns that they had worked with before the armistice of 1918. Once in the Dover area they were soon told that they were but part of an overall plan for the Dover defences.

Even as the first gunners arrived in the immediate post-Dunkirk period, the Germans were busy building up coastal batteries in the Pas de Calais area. Their batteries included not only coastal guns under protection but railway guns capable of shelling the Dover area, and it was not long (early August 1940) before the first shells had fallen. To counter this German build-up the British were rapidly supplementing the Dover defences, which had been severely run down during the inter-war years. Unfortunately for them they were also trying to bring on to the scene weapons which had not been used for many years. The first evidence of this was the arrival of the 234-mm (9.2-in) railway guns and the 305-mm (12-in) railway howitzers. These veterans had last been fired during World War I, but they were rushed to the Dover area and all the ammunition that could be mustered was sent with them. Neither weapon had any cross-Channel capability, but they were sent to provide local defences against invasion and generally to boost morale. At least one of the 234-mm (9.2-in) guns were always in the Hythe area, and the 305-mm (12-in) howitzers were grouped mainly in the Shepherdswell area in the region inland from Dover. Other 234-mm (9.2-in) railway guns patrolled the coastline as far as Hastings and sometimes beyond. Another 234-mm (9.2-in) gun was stationed near Canterbury.

But local defence was only one aspect of the Dover guns' existence. The local coastal defences had to be built up to a viable extent, and for this some 381-mm (15-in) coastal guns were planned. Those would take time to install as they were the same type as the famous 381-mm (15-in) guns emplaced to guard the Singapore naval base. Other smaller-calibre guns would need to be added and although some would be able to command the Channel narrows they would not be able to counter the Pas de Calais guns. That task fell to the Royal Marine Siege Regiment, which was hurriedly equipped with some of the oddest weapons ever devised in the history of artillery. Two of these were naval 356-mm (14-in) guns reluctantly released by the Royal Navy under high-level pressure. They had fixed mountings, one of them a gun mounting from a World War I monitor and the other a proofing stand from the Shoeburyness ranges. The first of these was named 'Winnie' after the Prime Minister and the other was accordingly named 'Pooh' when it was installed later.

To back up these two static guns it was decided to use railway guns in the form of the three 343-mm (13.5-in) veterans of World War I. These were HMGs 'Scene-Shifter', 'Gladiator' and 'Piece-Maker'. The old carriages had been extensively refurbished and fitted with new brakes that considerably enhanced their cross-country mobility. From an early stage of the process to introduce the railway guns, the Southern Railway had been involved. It had many reservations as to what the railway guns would do to the permanent way and to structures such as bridges and crossings. The army had to agree to pass over some bridges with extreme care and at very slow speeds, and that overcame many problems. Looking back, it



'Boche-Buster' was designed as a 14-inch gun, and as such during 1918 made the famous 'King's Shot', with King George V giving the command to fire. The 14-inch was replaced by an 18-inch howitzer barrel in 1926.

can be seen that the amount of disruption the Dover guns caused to what normal railway operations were still running was surprisingly small.

The first of the 343-mm (13.5-in) guns to arrive in the Dover area was 'Scene-Shifter', and as the conversion to take the new gun had been so hasty there had been no time to make the usual proofing, calibration and functional checks. So on 7 October 1940 the gun was fired out to sea with no other intention than to make sure everything was functioning and that the obturator on the breech mechanism was seated correctly to ensure that no propellant gases could leak out to the rear when the gun was fired.

The Dover 343-mm (13.5-in) railway guns were unwieldy things with no traverse possible on the carriage other than 2° to each side, and even that took a good deal of effort. Consequently the guns were useless against any form of moving target and were of value only against such static items as the Pas de Calais batteries. In return they were vulnerable to counterbattery fire, for they were virtually fixed to small areas of railway track. It was not difficult for the Germans to send over a reconnaissance aircraft from time to time to take pictures of where they happened to be, and the German guns could then send over a few shells with surprising accuracy: On December 10 a shell actually hit 'Piece-Maker' and killed one unfortunate Royal Marine. The main damage was to some of the carriage axle boxes, and as there were no spares available these had to be repaired by the local Southern Railway workshops.

Eventually all three guns settled into their main residences: 'Scene-Shifter' settled in at Lydden, 'Gladiator' at a siding near Martin Mill Station (where the shell hit 'Piece-Maker', which was temporarily based there at the time to allow free access to the coastal batteries for installation work), and 'Piece-Maker' near the Gunston Tunnel. As there had to be some form of calibration this was carried out by firing all three guns out to sea to ranges of 22860 m (25,000 yards), the resultant splashes being recorded on special cameras for the 'boffins' to compute their figures accordingly. By May 1941 it was time to see if the guns really could be useful in their intended role, and all three guns were fired at the Calais docks with a spotting aircraft ready to see what results were forthcoming. Unfortunately the Luftwaffe rather spoiled the day, for the spotting aircraft was chased away before full results were observed, but enough was learned to obtain some form of results.

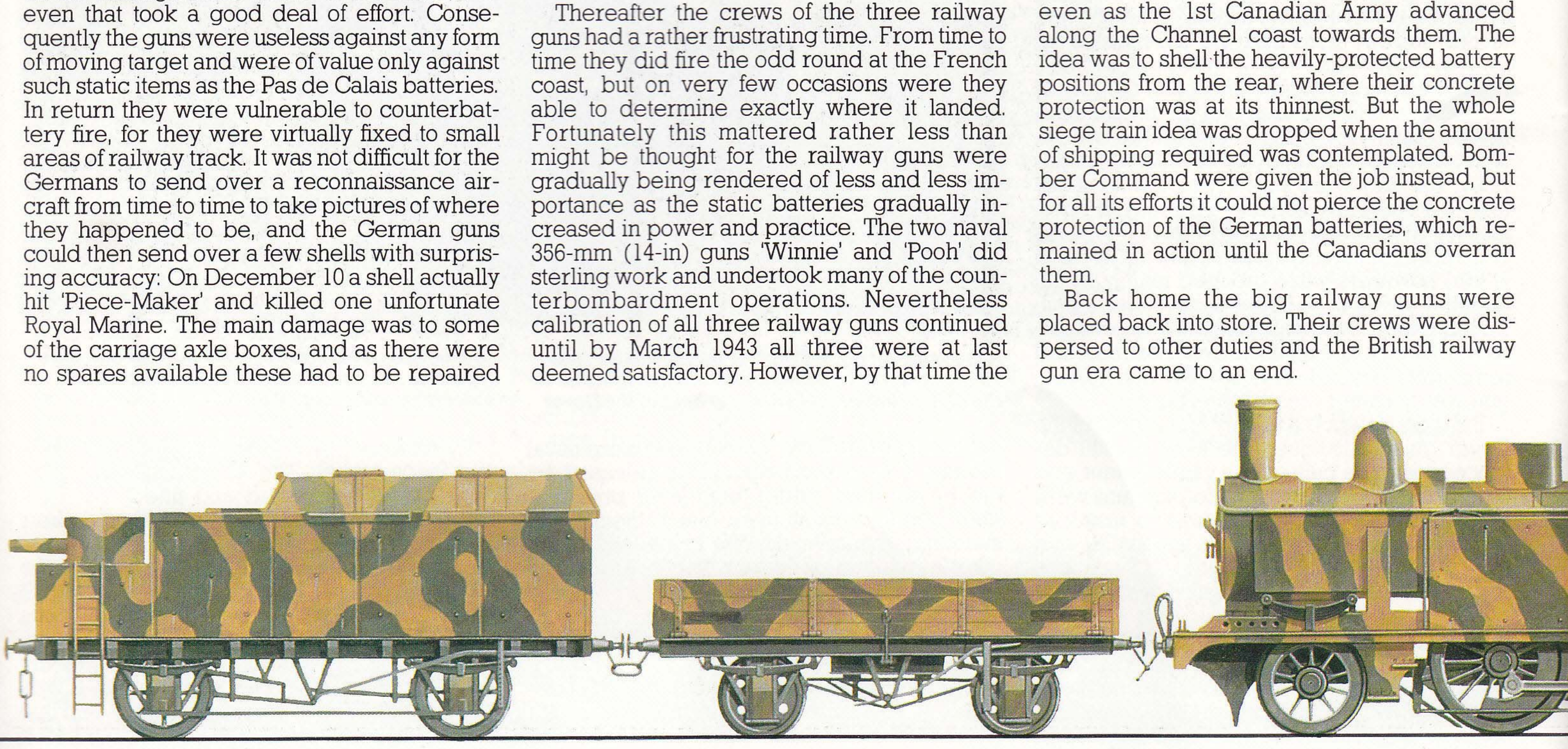
Static batteries to the fore

Thereafter the crews of the three railway guns had a rather frustrating time. From time to time they did fire the odd round at the French coast, but on very few occasions were they able to determine exactly where it landed. Fortunately this mattered rather less than might be thought for the railway guns were gradually being rendered of less and less importance as the static batteries gradually increased in power and practice. The two naval 356-mm (14-in) guns 'Winnie' and 'Pooh' did sterling work and undertook many of the counterbombardment operations. Nevertheless calibration of all three railway guns continued until by March 1943 all three were at last deemed satisfactory. However, by that time the 343-mm (13.5-in) ammunition stocks were so low that it was decided at a high level to conserve the existing rounds until a special task arose, and that special task was already in prospect.

Before leaving the Dover railway guns the 457-mm (18-in) railway howitzer 'Boche-Buster' should not be forgotten. That veteran was based at Bekesbourne but it had nothing to do with the cross-Channel guns. Its role was purely that of local defence and for possible use as an anti-invasion measure, for it lacked the range to achieve anything else. When it was moved, which was not often, it caused no end of havoc to the tracks over which it had to move, for its weight was far too much for what had once been the Eltham Valley Light Railway. From time to time it was called upon to fire the odd round. When a firing was imminent the local population was warned beforehand and advised to keep their windows closed. It made no difference for when 'Boche-Buster' fired all the local windows shattered, opened or closed.

By mid-1943 all four of the large railway guns were back under army command, and they were rolled north for training for that special task in prospect. The invasion of Europe was due to take place in the following year and all four of the heavy railway guns were earmarked to become part of the siege train that was expected to accompany the armies across the Continent. Training took place not only on the guns but off them, for it was anticipated that any tracks that might have been employed would more than likely be rendered useless and in some areas would be nonexistent. The troops therefore were trained to lay their own tracks. The carriages of the big guns were built to accommodate some track irregularities that would derail a conventional railway waggon, so even roughly-laid tracks could be used and the troops were trained to lay these rough tracks over almost any terrain. By the time they were trained they could lay track almost as fast as they could walk. They had their targets already in prospect: the very Pas de Calais batteries that were still shelling the Dover area even as the 1st Canadian Army advanced along the Channel coast towards them. The idea was to shell the heavily-protected battery positions from the rear, where their concrete protection was at its thinnest. But the whole siege train idea was dropped when the amount of shipping required was contemplated. Bomber Command were given the job instead, but for all its efforts it could not pierce the concrete protection of the German batteries, which remained in action until the Canadians overran them.

Back home the big railway guns were placed back into store. Their crews were dispersed to other duties and the British railway gun era came to an end.



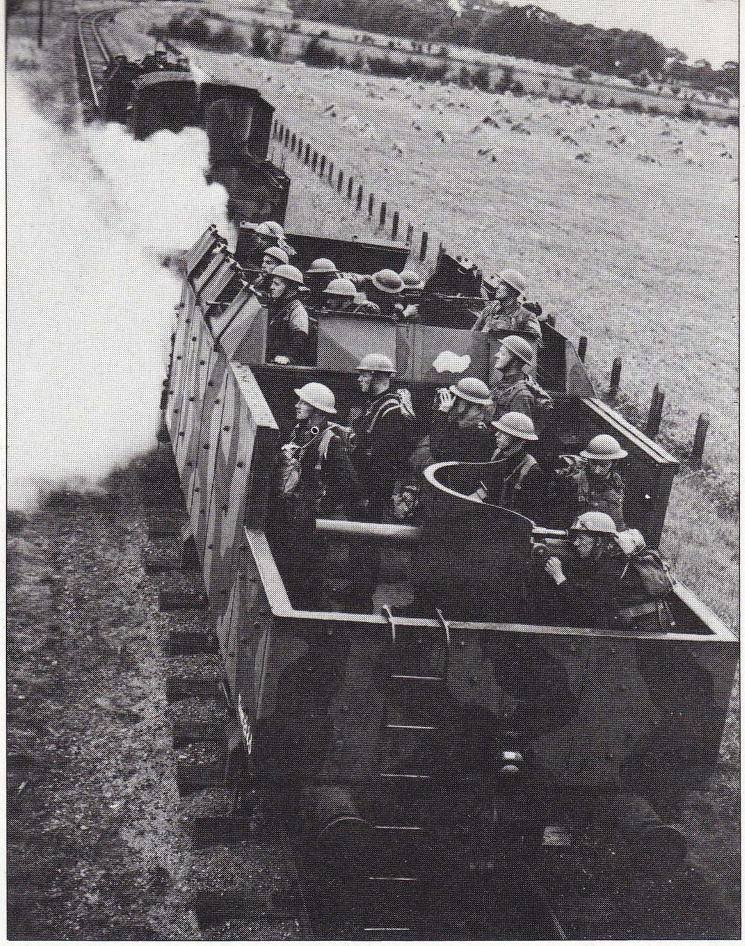
UK

British armoured trains

The British army operated armoured trains as far back as 1894 in the United Kingdom, but for several reasons the army was not particularly well versed in the subject in 1940, despite a good deal of development and the operation of some examples during World War I. Thus in 1940, when active consideration was given to using armoured trains as mobile defensive weapons in coastal areas, a certain amount of improvisation took place. The type of armoured train was formally established, the improvisation coming from the actual arming and armouring of the rolling stock, which was often carried out on an ad hoc basis, the work being completed in railway company workshops and military establishments alike.

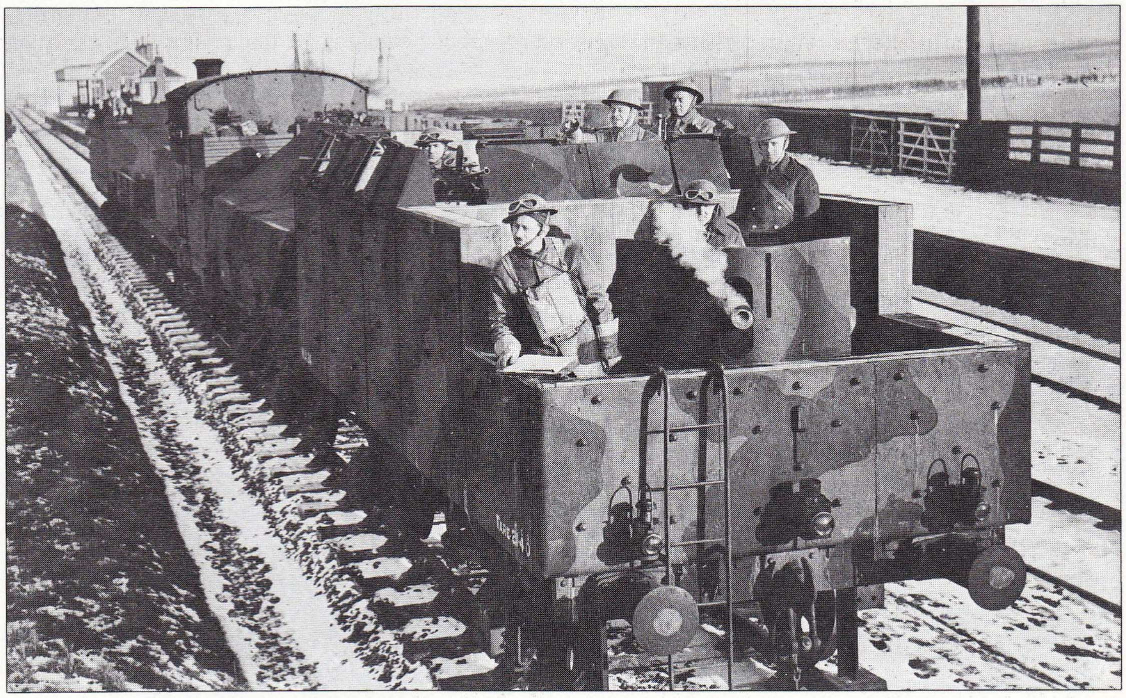
The locomotives to be used were all 2-4-2 types with integral coal stowage and side water tanks. Only limited armour was at first added to these locomotives (though this was later increased) but some form of camouflage paint finish was applied in all cases. Fore and aft of the locomotive at first were open flat-bed waggons, but these were later changed to tilt-covered or closed cargo waggons. At both the back and front of the train were the fighting or armoured trucks. These were converted steel coal-carrying waggons divided into two open compartments. One of these compartments was for riflemen or machine-gunners firing through embrasures in the sides. The other compartment, at the front and rear of the train, mounted a rather unusual weapon in the form of a 6-pdr (57-mm) gun of the type used during World War I to arm the original tanks. When the old tanks were declared obsolete their guns and mountings were placed into store pending some likely employment, and the armoured trains eventually formed that employment. On the trains the 6-pdr (57-mm) guns were mounted, together with their original tank armour shields, on pivots designed to allow fire to each side of the track. Anti-aircraft defence was usually some form of machine-gun on a central high-angle pivot mounting. At first these machine-guns were Lewis guns, but these were later replaced by Bren Guns.

The trains were allotted designations from **Train A** to **Train M**, and were assigned to the various army commands, initial priority being given to the east coast and Kent areas. Each train was given a length of track to patrol, the train returning to its own central location where the crews were housed and headquartered. As time went on the early armour thicknesses were increased and more rolling stock, usually in the form of accommodation waggons, was added to each train. An extra tender carrying more coal and water was another addition, and in some cases extra anti-aircraft flatcars carrying 40-mm Bofors gun were introduced. Some trains even had the luxury of their own reconnaissance armoured vehicles on the strength. These were usually light armoured vehicles or Universal Carriers mounting machine-guns, but special anti-aircraft light tanks were at one time considered. At one point some armoured trains such as H even had their own small tank component which could convert a basically defensive train into a useful fighting unit with offensive potential.

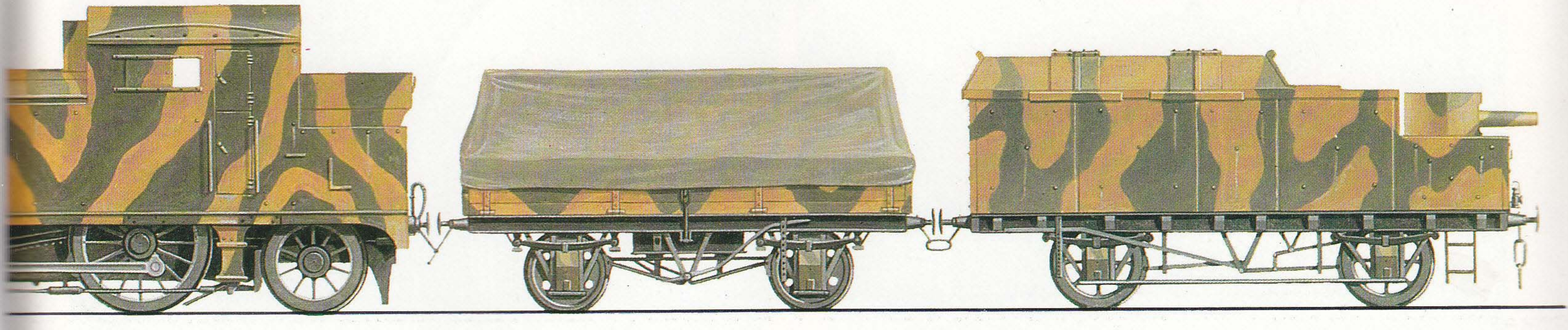


Right: One of the British armoured trains in simulated action in Suffolk, August 1940, with the old Great War 6-pdr tank gun clearly seen in the foreground. A German invasion was expected at any moment.

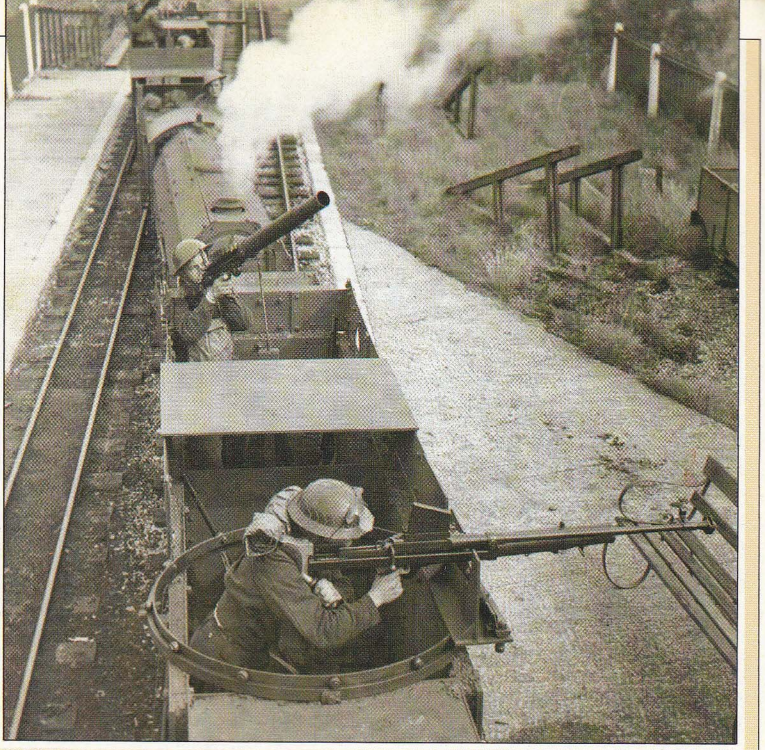
Below: One of the British armoured trains manned by Polish troops on the east coast of Scotland during winter of 1940-1, providing mobile defence against German landings.



Below: A typical British armoured train with the main 'fighting' trucks at each end armed with old 6-pdr guns from the original World War I tanks.



The Romney, Hythe and Dymchurch Railway at war



The armoured train armed with a Boys anti-tank rifle and two Lewis guns, 1940.

To the visitor the Romney, Hythe and Dymchurch Light Railway is a tourist attraction, but to the residents of the area the railway is a useful method of getting about, as any railway should be. Before 1940 it was also used as a light freight and gravel carrier and it was used as such until June 1940. By that time the area was part of the defence responsibility of the 6th Battalion, Somerset Light Infantry, which noted that the line extended over its operational sector and duly requisitioned the complete line and stock for its own purposes. The battalion's plans included a light armoured train, and at the line's own workshops it accordingly converted a locomotive (the 4-8-2 'Hercules') and two hopper waggons for the task.

The train was converted with assistance from the Royal Engineers and the Southern Railway, and was soon in use. The locomotive was extensively armoured as were the two trucks, which each had two fighting compartments. A central enclosed area divided two open bays, one of which had a ring mounting for a 14-mm (0.55-in) Boys anti-tank rifle and the other a central pivot for a Lewis gun capable of elevation for anti-aircraft use. If required the anti-tank rifle mounting could accommodate a co-axial Lewis gun as well.

The train was run by the Somerset Light Infantry itself, for among its men it counted quite a few trained railwaymen. In time the train became a noted feature of the area as it shuttled to and fro along the complete length of the line. It became a very proud possession of the 6th Battalion and came to be a notable high point of VIP tours around the defences of the area. Apart from its general news-worthy and morale-boosting function, the train also had a valuable defensive role and at one point was even instrumental in the destruction of a Messerschmitt Bf 109 fighter brought down by Lewis gun fire. The railway was also used to take troops to and from their various duties using unconverted rolling stock.

Eventually the infantry's employment of the railway passed under more official Royal Engineer control, by which time the need for the armoured train had somewhat diminished, for it was then 1941. The armoured train by then had its own protected siding and special supplies of track-repairing materials at pre-selected dumps along the line. Gradually the armoured train passed from use altogether, and the line was maintained only as a troop-carrying system.

By 1944 the line had its last operational use brought to such a peak of utilization that it was almost wrecked. The general area of the line was one of the main depots for the Pipe Line Under The Ocean (PLUTO), and the trains of the line were kept very busy carrying more than their fair share of all the materials that the giant pipeline assembly task involved. Quite separate from that operation was the construction of a special 40-mm Bofors gun mounting on one of the line's trucks. This gun was intended for local defence only and involved the use of outriggers to stabilize the gun in action.

Thus the Romney, Hythe and Dymchurch Light Railway played its small part in World War II, providing a small side-show in armoured train warfare and showing how even a small railway can become involved in larger things. The locomotive involved in the armoured train is still in service today and thus remains one of the few tangible reminders of the armoured train era.

USSR

Soviet armoured trains

Armoured trains have long been a feature of the Russian method of warfare, for only the railway train had any chance of being able to encompass the vast distances that travel inside Russia involves. For the Russians armoured trains provided a method of transporting troops and weapons over long distances to bolster a front, or provide a mobile reserve or to protect internal communications and lines against the attentions of raiding forces and internal dissidents. Consequently, during World War I the armoured train was an important Russian weapon.

Following the Bolshevik Revolution of 1917 the armoured train remained as important a weapon as ever for the Red Army and was extensively used by both sides during the Civil War of 1918-22. Thereafter, the trains that remained were kept in service but no more were built as the internal reorganization of the USSR had other priorities. Thus in 1941 the armoured trains still in existence were the same as those in use in 1918.

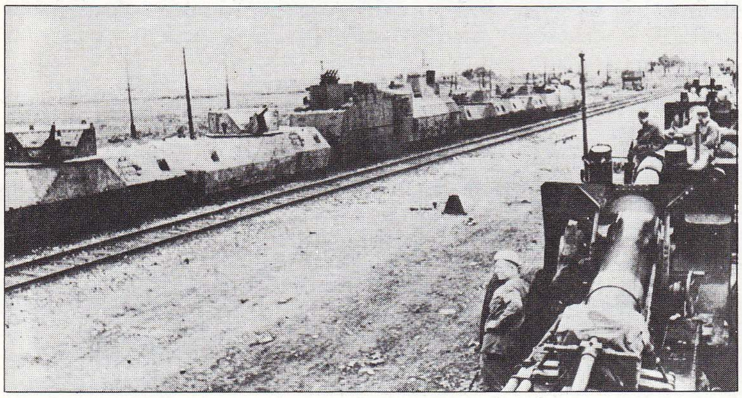
As such the trains were serviceable enough, but all had an aura of age about them. This was the result mainly of the large circular turrets mounted on many of the armoured waggons and the high smoke stacks of the locomotives. The armament of these old trains was usually made up of a mix of 76.2-mm (3-in) guns and a number of Maxim machine-guns, with armoured waggons carrying the living and office accommodation for the large numbers of men involved with each train.

When the Germans invaded the Soviet Union in 1941 they captured several of these old Tsarist-era trains and used them for their own purposes, but these were soon replaced in Red Army service by a number of improvised armoured trains of several different patterns. Some of these were little more than armoured box waggons with a field piece firing from its own carriage. Others were more complicated with carefully armoured and curved superstructures involving modern guns in turrets with quite involved fire-control systems. To these large trains were added substantial numbers of what became virtually a Soviet railway warfare trademark, namely the mounting of armoured cars on railway wheels to be driven up and down tracks either in concert with or quite independent from full armoured train units. These railway armoured car units had several military tasks, ranging from the patrol of the tracks to keep them free of mines and obstacles, to the countering of raiding parties that often broke through the wide-open lines of the Eastern Front.

One feature that the newer Red Army armoured trains always had that the earlier models lacked was anti-aircraft defence weapons. On most Red Army trains these were quadruple Maxim machine-gun mountings, with almost every waggon having at least one further machine-gun mounting somewhere. Another Soviet practice followed German example by using tank turrets with anti-tank weapons on many waggons.

Every Red Army formation at army level had at least one armoured train under its control, and sometimes more. They were used to follow up the Red Army as it advanced and were often used by some formations as mobile headquarters during the preparation for major operations and as staff headquarters during an advance. At least one armoured train was employed during the brief war against Japan in 1945.

A Soviet armoured train captured by the Germans and armed with 76.2-mm guns and a quadruple Maxim Gun anti-aircraft mounting.



A captured Soviet armoured train manned by Italian troops fighting with the Germans in Russia.